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SEVENTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF MICHIGAN,

LANE LIBRARY

FOR THE

FISCAL YEAR ENDING SEPT. 30, 1879.

BY AUTHORITY.

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Office of the Secretary of the State Board of Health,
Lansing, Michigan, December, 1879.

To HON. CHARLES M. CROSWELL, *Governor of Michigan:*

SIR:—In compliance with the laws of this State, I present to you the accompanying Report for the fiscal year ending September 30, 1879.

Very respectfully,

HENRY B. BAKER,

Secretary of the State Board of Health.

RESOLUTION OF THE BOARD RELATIVE TO PAPERS PUBLISHED IN ITS ANNUAL REPORT.

Resolved, That no papers shall be published in the Annual Report of this Board except such as are ordered or approved for purposes of such publication by a majority of the members of the Board; and that any such paper shall be published over the signature of the writer, who is entitled to the credit of its production, as well as responsible for the statement of facts and opinions expressed therein.

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REPORT.

This is the Seventh Annual Report of the Secretary of the Michigan State Board of Health, and is for the fiscal year ending September 30, 1879. The first part of the volume, paged in Roman numerals, contains the Secretary's report of the work of the Board, and in the office of the Secretary of the Board, as well as special reports, communications, etc. The second part of the volume contains twenty papers and reports on different sanitary subjects. Of these, fourteen were prepared by members or committees of the Board, one from material contributed by correspondents of the Board; two are revisions, embodying new laws, of circulars previously issued by the Board; four were prepared in the office of the Secretary from data contributed by correspondents and meteorological observers on blanks, or in reply to circulars, issued by the Board. The Report contains 42 illustrations, 15 of them being full-page plates, and four, full-page maps.

In order that no misunderstanding may arise, it may be well to state that the papers are printed, as in previous Reports, under the following resolution:—

"*Resolved*, That no papers shall be published in the Annual Report of this Board except such as are ordered or approved for purposes of such publication by a majority of the members of the Board; and that any such papers shall be published over the signature of the writer, who is entitled to the credit of its production, as well as responsible for the statements of facts and opinions expressed therein."

The names and postoffice addresses of members of the Board and the dates when their terms of office expire are as follows:—

ROBERT C. KEDZIE, M. D., President, Agricultural College, Lansing, 1881.
HOMER O. HITCHCOCK, M. D., Kalamazoo, 1881.
HON. LEROY PARKER, Flint, 1883.
REV. DANIEL C. JACOKES, D. D., Pontiac, 1883.
HENRY F. LYSTER, M. D., Detroit, 1885.
JOHN H. KELLOGG, M. D., Battle Creek, 1885.
HENRY B. BAKER, M. D., Secretary of the Board, and Superintendent of Vital Statistics, Office at Lansing.

WORK OF THE BOARD.

STANDING COMMITTEES.

Certain kinds of work laid out by the Board have been classified and assigned to standing committees, each of which, except No. 10, now consists of a single member. The names and members of these committees are as follows:—

1. Epidemic, Endemic, and Contagious Diseases,—Homer O. Hitchcock, M. D.
2. Sewerage and Drainage,—Henry F. Lyster, M. D.
3. Food, Drinks, and Water-Supply,—Robert C. Kedzie, M. D.

4. Buildings—Public and Private; including Ventilation, Heating, etc.,—Rev. D. C. Jacokes, D. D.
5. Climate, Geology, Topography, and Vegetation, in their relations to health,—Henry F. Lyster, M. D.
6. Disposal of Excreta and Decomposing Organic Matter,—John H. Kellogg, M. D.
7. Poisons, Explosives, Chemicals, Accidents, and Special Sources of Danger to Life and Health,—Robert C. Kedzie, M. D.
8. Occupations, Recreations, and Habits in Relation to Health,—John H. Kellogg, M. D.
9. Education: the Relations of Schools to Health, the Kind and Methods of Instruction in Use, and Methods to be Proposed,—Rev. D. C. Jacokes, D. D.
10. Sanitary Survey,—Rev. D. C. Jacokes, D. D., Hon. LeRoy Parker, Henry B. Baker, M. D.
11. The Death-rate as influenced by Age, Climate, and Social Condition,—Henry B. Baker, M. D.
12. Legislation in the Interests of Public Health,—Hon. LeRoy Parker.
13. Finances of the Board,—Hon. LeRoy Parker.
14. Mental Hygiene,—Homer O. Hitchcock, M. D.
15. Diseases of Animals, in Relation to Public Health,—Henry B. Baker, M. D.

WORK OF THE OFFICE OF THE BOARD, FISCAL YEAR, 1879.

The main items of the work of the office were in the last Report grouped under two general heads, namely, the Collection of Information, and the Dissemination of Information. A third general head—the Creation of Information—might properly have been added, for by the compilation of information received from various sources new knowledge is gained. As a matter of fact, a large amount of work is required for the preparation, arrangement, and proper utilization of the material collected from different sources; and in this Report mention is made of some of this work, under the head of Compilation of Material Collected, which is placed in its proper order between the Collection and the Dissemination of Information, pages xvi.-xvii.

COLLECTION OF INFORMATION.

ANNUAL REPORTS BY HEALTH OFFICERS FOR THE YEAR ENDING DEC. 31, 1878.

In February, 1879, a circular (30) which had previously been approved by the Board was sent to all the health officers of townships, cities, and villages in the State (1,228), transmitting to them the blank form G for their annual reports, and also a blank for a copy of their record of cases of diseases dangerous to the public health which had occurred during the year. The circular is similar to Circular 22, printed on pages ix-x of the Report for 1878, and which was sent out for the year 1877.

The blank for a copy of the record of cases of diseases dangerous to the public health is printed, reduced in size, on page 278 of this volume. The blank form G is printed (with dates for the year 1877 instead of 1878) on pages xi-xii of the Report for 1878.

The number of reports on these blanks received from health officers is stated in a tabular summary on page xi.

Circular 30 is as follows:—

[30.] OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH,
Lansing, Michigan, January, 1879.

To the Health Officer:

SIR:—Herewith I send you a blank form (G†) for your use in making your Annual Report to this Board, required by law,* for the year ending December 31, 1878. PLEASE FILL OUT AND RETURN THIS REPORT AS SOON AS POSSIBLE. In making this report, you will probably do well to confer with the President, and also with the Clerk of your Board. The blank is somewhat similar to one sent to the Clerk of your Board, except that this is fuller in regard to the causes of diseases and deaths, and in those questions for the best answer of which the knowledge of the physician is needed.

Your report should be made out *for the exact territory over which your board has jurisdiction*, and for which you are the health officer, and it *should not include* anything outside of such jurisdiction. A township board of health *does not have jurisdiction in an incorporated village*, even though such village be situated within the limits of the township. If you have been appointed health officer for a township and a village, it is necessary that you make separate reports for each, just as separate as if they were made by different persons.

I send you a blank sheet for your Report of Cases of Diseases Dangerous to the Public Health. If you have any cases on your Record, PLEASE FILL OUT AND RETURN THIS REPORT AS SOON AS POSSIBLE. If you have more cases to report than can be reported upon one side of a sheet (27), please write to this office for blanks, stating the additional number of sheets you need. If you have no case to report *please send a definite statement to that effect;* and whether you have cases recorded or not, *please state your belief as to the number of cases of each of such diseases that have occurred within your jurisdiction that have not been legally reported to you.* You will find blank spaces for this near the middle of the first page of the blank form (G†).

The blank which I send for your report of Cases of Diseases is essentially the same form as the one several times recommended by this Board as a proper form for a Record of such cases. For the purpose of beginning or continuing such a Record, you can obtain sheets, or book of sheets, similar to this one, except that they are for a Record instead of a Report, of W. S. George & Co., Lansing, Mich., for eighty cents per quire or three dollars per hundred. If desired, the same dealers will bind them at usual prices.

The law requires that a notice be given to the Local Board of Health, or to the Health Officer, by every householder, whenever he shall know that any person within his family is taken sick with the small-pox, *or any other disease dangerous to the public health;* the law also requires physicians to report all such cases: see sections (1734) and (1735) of Compiled Laws of Mich., 1871. The sections just mentioned refer only to township boards of health, but section (1740), (49 of the same chapter, 46 of the Compiled Laws of 1871), seems‡ to make them apply to cities and villages, except where special charter provisions conflict with this general law. If there should be any doubt, on the ground of charter provisions or otherwise, immediate steps, by ordinance if necessary, should be taken to secure such notices and reports.

It is not expected that it will always be possible, from the notices which you receive, to fill every column of your record; but so much as it is possible to learn concerning each case should be recorded and reported, because the single fact of the number of cases of sickness from each such disease will be of value in connection with the records of deaths and other knowledge collected at this office. Do not fail to record and report all cases of such diseases under your own care.

It is again recommended that your Board of Health *have a sufficient number of blank notices printed* for the use of *householders* and *physicians* within your jurisdiction, *and*

distribute them in order to call attention to the law, and secure the material for a complete record in your office. The two sections of law referred to above should be printed on the back of each blank. You can find the form for such blanks for notices on pages 13 and 14 of the First Report, and on pages xiii and xiv of the Second Report of this Board.§ The blanks can be purchased of W. S. George & Co., Lansing, Mich., for one dollar per hundred.

The document on the "Restriction and Prevention of Diphtheria," issued by this Board, has been stereotyped, and copies can be obtained, by local boards of health and others, of W. S. George & Co., Lansing, Mich., at the following prices: 100 for $1.75; 200 for $2.50; 300 for $3.50; 400 for $4.25; 500 for $4.75; 1,000 for $8.00. A large number of these documents have already been distributed throughout the State by this Board, but its limited appropriation does not permit it to make as extensive distributions as are often desirable in places where the disease prevails.

In case any disease should appear in your locality as an epidemic, please make a Special Report of the fact to this office as soon as possible. It is also expected that you will study and record the conditions coincident with the rise, progress, and decline of any such epidemic, and in due time report the same to this Board. Concerning every such occurrence you should be able to report some facts which will be of use in advancing the cause of public health.

By direction of the State Board of Health.

Very Respectfully,

HENRY B. BAKER,

Secretary.

Please preserve and file the circulars which you receive from this office.

---

* Act No. 81, Laws of 1873, SEC. 8. It shall be the duty of the health physician, and also of the clerk of the local board of health in each township, city, and village in this State, at least once in each year, to report to the State Board of Health their proceedings, and such other facts required, on blanks and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of Health.

† [The blank form G is printed, reduced in size, on pages xi-xii of the Report for 1878. The blank for Report of Cases of Diseases Dangerous is printed, reduced in size, on page 278 of this volume. It is on sheets 15½ by 19½ inches in size, printed alike on both sides.]

‡ [Section 1740 was so amended by the Legislature in 1879 as to make the mayor and aldermen of each incorporated city, and the president and council of each incorporated village in the State, in which no board of health is actually organized under the charter, a board of health with all the powers and duties of boards of health under chapter 46, except where inconsistent with charter provisions.]

§ [It is also given on pages 267-8 of this volume.]

ANNUAL REPORTS BY CLERKS OF LOCAL BOARDS OF HEALTH, FOR THE YEAR ENDING DEC. 31, 1878.

At the same time that Circular 30 was sent to health officers, Circular 31, which had also been approved by the Board, was sent to all the clerks of local boards of health in the State (1,228), and with it was sent a blank form (H) for their annual report for the year ending with December, 1878, and the same blank for report of cases of diseases dangerous to the public health that was sent to health officers. The circular (31) is similar to Circular 30, pages ix.-x. The blank form H sent to clerks is like form G sent to health officers, except that the form for health officers is somewhat "fuller in regard to the causes of diseases and death, and in those questions for the best answer of which the knowledge of the physician is needed." The number of reports received from clerks on these blanks is stated in the following tabular summary:—

TABULAR SUMMARY.—*Number of Annual Reports, on Forms G and H, and Copies of Records of Cases of Diseases Dangerous to the Public Health, received from Health Officers and Clerks of Local Boards of Health, for the Year ending December 31, 1878.*

BOARD OF HEALTH.	ANNUAL REPORTS.			Copies of Records of Diseases Dangerous to the Public Health.		
	Total.	By Health Officers.	By Clerks.	Total.	By Health Officers.	By Clerks.
Total	872	472	400	399	233	166
Township	807	426	381	365	211	154
City	18	12	6	8	5	3
Village	47	34	13	26	17	9

This is 59 annual reports and 42 copies of records more than were received for the year 1877.

Several of the health officers have contributed valuable material in their annual reports and in special reports, in addition to that provided in the blanks. Some of this material is used in a report by Dr. Hitchcock, the committee on epidemic, endemic, and contagious diseases, pages 103–137, and in the article on Weekly Reports of Diseases in 1878, pages 395–508.

COMPLETION AND CORRECTION OF REPORTS.

As for the preceding year, considerable correspondence was necessary with some of the authors of these reports, in order to secure reports sufficiently complete and accurate to be of use. To facilitate this correspondence essentially the same printed letters were used as are printed on page xiv. of the Report for 1878. On the whole the character of the reports received was greatly improved over those for the year 1877.

RETURN OF NAMES AND POSTOFFICE ADDRESSES OF HEALTH OFFICERS OF TOWNSHIPS, CITIES, AND VILLAGES.

About the first of May, 1879, a circular (32) was sent to all the supervisors in the State (in some counties to those returned for the year 1878) transmitting a blank form (E) and an addressed envelope for the return of the name and postoffice address of the health officer of the township, whom the law requires to be appointed within 30 days after the annual township meeting in April. The circular is essentially the same as Circular 26, printed on pages xv–xvi of the Report for 1878. Form E is as follows:—

[Please fill every blank, by words or figures, or as directed in the foot-notes. Do not mark out any printed word.]

[E.]

To the Secretary of the State Board of Health, Lansing, Michigan:

SIR:—On the.....day of....., 187.., the Township Board, being the Board of Health of the Township of....., County of....., State of Michigan, met for the transaction of business and*....appointed a Health Officer.

The name of the Health Officer of this township is.....

His postoffice address is....., County of....., Michigan.

He†.....a physician.

He†.....the Supervisor of this township.

‡....., Supervisor of the township of.....;

P. O. Address:.....

‡....., Township Clerk and Clerk of the Board of Health;

P. O. Address:.....

This return is made out by §.....

Dated at....., this.....day of....., 187...

*If re-appointed, write "re-"; if not, draw a line.

†Insert the word "is," or "is not," as the case may be.

‡It is not essential that more than one of the officers SIGN this return, but it is desirable to have the name and P. O. address of each given. If either officer writes in the name of the other, this fact should appear on this return, so that the officer making the return may be known.

§Insert the words "the Clerk," "the Supervisor," "the Clerk and Supervisor," or otherwise state the facts.

At the same time a circular (33) was sent to the mayor of every city and to the president of every incorporated village in the State, accompanied by a blank form (F) and an addressed envelope for the return of the name and address of the health officer. To guard against any loss of circulars through the mails and to make it more certain that the attention of the city or village council should be called to the subject, a copy of the circular and blank, also with an addressed envelope, was at the same time sent to the clerk or recorder of every city and incorporated village in the State. Form F is printed on page xviii. of the Report for 1878. Circular 33 is printed herewith.

[33.] OFFICE OF THE STATE BOARD OF HEALTH,
Lansing, Mich., April, 1879.

To the Mayor and Aldermen of the City, or the President and Council of the Village:

GENTLEMEN:—Your attention is respectfully asked to the general law relative to Boards of Health in this State, as amended by Act No. 56, Laws of Michigan, 1877, which amended section 1693, being section 2 of chapter 46, Compiled Laws of 1871. The amendment is such that whereas, before a health officer might be appointed by the board of health, it is now required that such officer shall be appointed; and if practicable he must be a physician. The amended law also requires that *notice of such appointment shall be sent to the Secretary of the State Board of Health.* The section as amended is as follows:—

(1693.) SEC. 2. Every township board of health shall appoint and constantly have a health officer of the township who shall, where practicable, be a physician and sanitary adviser, and an executive officer of the board: *Provided*, That in townships where it is not practicable to secure the services of a well-educated and suitable physician, the board may appoint the supervisor or some other person as such health officer. The board of health shall establish his salary or other compensation, and shall regulate and audit all fees and charges of persons employed by them in the execution of the health laws and of their own regulations. Within thirty days after the annual township meeting in each year, the board of health shall meet for the transaction of business, and shall appoint or reappoint a health officer, and shall immediately cause to be transmitted to the Secretary of the State Board of Health, at Lansing, the full name and postoffice address of such health officer, and a statement whether he is a physician, the supervisor, or some other person not a physician. A special meeting of the board may be called by the order of the president or of any two members of said board.

This section, as amended, refers as before only to township boards of health, but

section 49 of the same chapter (chapter 46 of the Compiled Laws, 1871) makes it apply to cities and villages. That section is as follows:—

(1740.) SEC. 49. The mayor and aldermen of each incorporated city, and the president and council or trustees, of each incorporated village in this State, shall have and exercise all the powers and perform all the duties of a board of health, as provided in this chapter, within the limits of the cities or villages, respectively, of which they are such officers.*

The force and application of this section having been questioned in one instance, in order to dispel any doubts that have arisen or that might otherwise arise because of the recent amendments of the chapter, the opinion of the Attorney General of the State has been obtained on this subject. His opinion is as follows:—

"In reply I beg leave to say that the officers mentioned in section 1740, Compiled Laws of 1871, are required to carry out, in all respects, the provisions of chapter 46, Compiled Laws, unless the charters of the respective cities and villages have made other provision for guarding the public health. It is impossible to say in the abstract how far charter provisions may stand side by side with general enactments, such as chapter 46, Compiled Laws, or how far one may modify the other. Each case must stand upon its own basis. Of course it follows from what I have stated that a 'health officer' must be appointed in cities and villages whose charter provisions do not conflict with the general law. "Very respectfully,

"OTTO KIRCHNER, Attorney General."

It is believed that there is nothing in your charter that conflicts with this provision of the general law.

In complying with the law please use the printed envelope and blank form (F) herewith transmitted, to return to this office the name of the physician whom your honorable body appoint, or have appointed, as your health officer. Have the kindness to add a statement of the time when his term of office will expire. In this blank, provision is made for reporting a health officer not a physician, although it is believed to be "practicable to secure the services of a well-educated and suitable physician" in every city and incorporated village in this State. Please have the fact whether the health officer is a physician stated in the return, as provided for in the blank form.

A return is expected from your corporation, even though some of the duties of a board of health are delegated to other persons than the Mayor and Aldermen, or President and Council, as the case may be. It is believed that the duty of making a return in accordance with section 1693, as lately amended, is not delegated, but is one of "the duties of a board of health as provided in this chapter" that must be performed by your honorable body in accordance with the general law hereinbefore referred to, namely, Sec. 1740 (Sec. 49, chapter 46), Compiled Laws of 1871. If your charter contains such provisions as make it clear that this duty should be performed by some other body than your own, will you have the kindness to transmit this communication to that body, and to inform this Board of the fact?

The law requires that the local board of health shall "constantly have a health officer." If, by reason of the death, resignation, or removal of your health officer, another person shall be chosen to that office, it will facilitate our work if you will cause a notice of such change to be sent to this office.

The amended law relative to the Health Officer very properly requires that "The board of health shall establish his salary or other compensation." In one instance a person who acknowledged that he had been appointed Health Officer of a city has declined to report to this Board, giving as a reason that his appointment was simply nominal, that he received no compensation, and had taken no oath of office or in

* This section has been amended by the legislature of 1879, substantially in accordance with the opinion of Attorney General Kirchner, given herewith. The amendment will take effect ninety days after the close of the session.—[The amended section 1740 is printed on page 272 of this Report.]

any way signified his acceptance of the office. This leads to the suggestion that the person whom you appoint, or have appointed, as your Health Officer be directed to take and subscribe the official oath required by Sec. I., Art. xviii., of the Constitution of this State, and file the same with the clerk of your corporation, before the return of his name and address is made to this office, which the law requires to be done "immediately," and that in case his acceptance of the office be not thus signified, it should be considered that the office is not accepted, and another appointment be made.

In addition to his services as sanitary adviser of your local board of health, the law also requires that your health officer shall report to this board annually, and "whenever required to do so by the State Board of Health." (Sec. 8, Act 81, 1873.) It is also desirable that he correspond freely with this office, concerning subjects connected with the public health in your locality. Any important sanitary experience of your board may, if thus reported, be made useful to other boards of health throughout the State.

By direction of the State Board of Health.

Very Respectfully,

HENRY B. BAKER,
Secretary.

From a large number of localities no return of the name of a health officer was received, and in June, 1879, a second demand was made by the same means as before, on all delinquent townships, cities, and villages, for such a return. The number of health officers finally returned for the year 1879 was as follows:—

From townships	834
From cities	42
From villages	122
Total	998

Every city in Michigan, except the newly chartered city of Mt. Clemens, returned the name and address of a health officer; and in every city, except Bay City, the health officer appointed was a physician, as the law requires. In 1878 but 855 health officers were returned from all the townships, cities, and villages.

METEOROLOGICAL REPORTS.

Two hundred and forty monthly meteorological registers have been received during the year, nearly all on blanks supplied from this office, a copy of which, reduced in size, is printed on page 216 of the Report for 1878.*

Records of meteorological observations have also been received from J. Robinson, M. B., Fort Frances, British North-West Territory, and from the health departments of several cities outside the State, in connection with the mortality statements acknowledged in the Secretary's annual report of property, on page xix and following pages.

The names and localities of observers in the State, and the months for which registers have been received from them from the beginning of their reports to this Board up to the close of the fiscal year 1879, are stated in a tabular list on page xv. The statements of registers received include both months named.

*The directions for taking observations and for care of instruments, which are printed on the back of the blanks for meteorological registers, are also printed on pages xxxv-xxxix of the Report

Names of Observers, and Months for which Meteorological Reports have been Received from them, to September 30, 1879.

Name of Observer.	Location.	Months for which Registers have been Received.
Upper-Peninsular Division.		
J. T. O'Keefe, Sergt. Sig. Corps, U. S. A.	Marquette	July and Sept., 1879.
Rev. A. W. Bill	Menominee	Oct., 1878, to Sept., 1879.
North-Western Division.		
Carroll E. Miller, M. D.	Cadillac, Wexford Co.	June to Sept., 1879.
H. T. Calkins, M. D.*	Fyfe Lake, Gr'd Traverse Co.	Jan., 1875, to Dec., 1877.
Northern Division.		
Dr. A. M. Gerow	Cheboygan, Cheboygan Co.	Nov., 1878.
H. T. Calkins, M. D.*	Petoskey, Emmet Co.	Jan., 1878, to Sept., 1879.
North-Eastern Division.		
James A. Barwick, Sergt. Sig. Corps, U. S. A.	Alpena, Alpena Co.	Jan. to Sept., 1879.
J. E. Fair	Harrisville, Alcona Co.	Sept., 1879.
James S. Reeves, M. D.†	East Tawas, Iosco Co.	Feb., 1876, to April, 1877, except Sept., 1876.
Western Division.		
S. C. Emery, Sergt. Sig. Corps, U. S. A.	Grand Haven, Ottawa Co.	Jan. to Sept., 1879.
Lee S. Cobb	Nirvana, Lake Co.	Nov., 1878, to Sept., 1879.
Central Division.		
I. N. Mitchell	Hastings, Barry Co.	Sept., 1879.
J. J. Grafton, Warden State House of Correction	Ionia, Ionia Co.	May to Sept., 1879.
Prof. R. C. Kedzie	Agricultural College, Lansing	Oct., 1875, Feb., 1876, Jan. 1877 to Dec. 1878.
A. W. Nicholson, M. D.	Otisville, Genesee Co.	May, 1877, to Sept., 1879.
Bay and Eastern Division.		
W. O. Bailey, Sergt. Sig. Corps, U. S. A.	Port Huron	Aug. and Sept., 1879.
J. S. Caulkins, M. D.	Thornville	Dec., 1876, to Sept., 1879.
South-Western Division.		
Henry F. Thomas, M. D.	Allegan, Allegan Co.	Nov., 1875, to Dec., 1876.
John Bell, M. D.	Benton Harbor, Berrien Co.	Nov., 1875, to Sept., 1879, except May and June, 1879.
James S. Reeves, M. D.†	Niles	June, 1877, to Sept., 1879.
Southern-Central Division.		
Jacob Breedon	Adrian	Aug. and Sept., 1879.
J. H. Kellogg, M. D.	Battle Creek	Jan., 1876, to Sept., 1879.
Lyman P. Alden, Supt. State Pub. School	Coldwater, Branch Co.	Oct., 1875, to Sept., 1879.
E. H. Van Deusen, M. D., Supt. Asylum for Insane.‡	Kalamazoo	Dec., 1875, to March, 1878.
Geo. C. Palmer, M. D., Supt. Asylum for Insane.‡	Kalamazoo	April, 1878, to Sept., 1879.
Edwin Stewart, M. D.	Mendon	Jan., 1877, to Sept., 1879.
Dr. E. Hause	Tecumseh	Dec., 1875, to Sept., 1877.
Harrison Peters, M. D.	Tecumseh	Oct., 1877, to Sept., 1879.
C. M. Woodward, M. D.	Tecumseh	March and April, 1876.
Frank P. Cook	Three Rivers, St. Joseph Co.	July and Aug., 1879.
Prof. L. McLouth, State Normal School	Ypsilanti	Dec., 1875, to Sept., 1879.
South-Eastern Division.		
C. Henri Leonard, M. D.	Detroit	Dec., 1875, to Feb., 1879.
Theo. V. Van Heusen,§ Sergt. Sig. Corps, U. S. A.	Detroit	Dec., 1875, to Dec., 1878.
C. F. R. Wappenhaus,§ Sergt. Sig. Corps, U. S. A.	Detroit	March to Sept., 1879.
F. W. Higgins, Supt. Woodmere Cemetery	Detroit	Jan., 1876, to Sept., 1879.
L. G. Gorton	Detroit	Sept., 1879.
Wm. C. West, M. D.	Monroe	Feb., Mar., Apr., May, Sept., Oct. 1876, Jan. to July, 1877, March to Aug., 1878.
H. W. Downing	Monroe	Nov. and Dec., 1878, Mar., 1879.
Albert Yates, M. D.	Washington	Sept., 1878, to Sept., 1879.
T. J. Langlois, M. D.	Wyandotte	July and Aug., 1879.

* Removed from Fyfe Lake to Petoskey.
† Removed from East Tawas to Niles.
‡ Since February, 1877, the registers have been filled and the observations apparently taken by A. M. Munn.
§ Also furnishes monthly summaries.

A compilation of the meteorological registers received for the calendar year 1878 has been made in the office of the Secretary. It is printed on pages

335–394, of this Report. A statement of the meteorological instruments supplied during the year to observers is given in the Secretary's annual report of property, on page xxi.

REGULAR CORRESPONDENTS.

During the year 19 new correspondents have been added to the official list. The whole number is now 135. The following named articles in this Report are based on material contributed by some of these correspondents: Diseases in Michigan in 1878 (pages 147–232), Water-Supply of Localities in Michigan (pages 279–288), Weekly Reports of Diseases in Michigan in 1878 (pages 395–508).

REPORTS OF DISEASES IN MICHIGAN IN 1878.

In addition to the reports by health officers, already mentioned, replies were received from 46 correspondents, to Circular 29 relative to the diseases in Michigan in the year 1878. The circular is similar to Circular 24 issued for the preceding year. It is printed on pages 150–176, in paragraphs alternating with paragraphs of a summary of the replies, which summary was made in the office of the Secretary. The replies are printed on pages 179–231.

WEEKLY REPORTS OF DISEASES.

Postal-card blanks for weekly reports of diseases, and blank record-books, have been supplied during the year to such regular correspondents of the Board as have consented to make reports, and to such health officers of cities as have complied with the demand made for weekly reports. A sample of the blank used is printed on page 398; a sample section of the record-book is on page 254 of the Report for 1878. About 3,221 reports were received during the year from the health officers of 31 cities, and from 69 regular correspondents of the Board. A compilation from these reports, made in the office of the Secretary, is printed on pages 395–508, and is believed to be a valuable contribution to knowledge on the important subject of conditions of prevalence of those diseases which cause most sickness.

BOOKS AND PERIODICALS.

A list of the books and periodicals received by purchase, gift, or exchange, during the year, and of donors, may be found in the Secretary's report of property, on xxii. and following pages.

COMPILATION OF MATERIAL COLLECTED.

A large part of the information relative to sickness and all relative to meteorological conditions is contributed, by unpaid observers, because of interest in the work and a desire to promote the cause of public health. Lest it should overtax the generosity of its coadjutors, the State Board of Health does not ask its meteorological observers to average or even foot the columns on the registers. The observers are not asked to make any reductions from the observed readings of the psychrometer and barometer, the relative and the absolute humidity being computed, and the records of observations of the barometer being "reduced to freezing point,"—corrected for temperature—at this office. This work has to be done in the office after the registers are received; and from the summaries obtained tables, exhibits, and diagrams are planned and constructed, such as are printed in the article on pages 335–394.

The compilation of the thousands of weekly and other reports of sickness, so as to endeavor to obtain and exhibit useful results, is another large share of the work in the office. The articles on pages 147–232, and on 395–508, exhibit some of the results of this work. In order that there may be a uniformity of plan and a continuity in the replies by correspondents, they are edited and arranged alphabetically by divisions before being published. A general summary for the State is compiled from the replies. A considerable amount of work is spent in keeping up the several books in the office. It is customary to keep a record of all distributions of documents, that none may be unnecessarily duplicated, and for other reasons.

After the manuscript is prepared for printing, care is used that the printed circular, blank, or article in the Report, shall be as it was designed,—the proof being all carefully read in the office, and compared with the original manuscript.

DISSEMINATION OF INFORMATION.

SIXTH ANNUAL REPORT.

The distribution of the Annual Report of this Board for the year 1878 to State, United States, county, and township officers was made by the State Department in January and May, 1879. A distribution to the health officers whose names and addresses had been returned to this office for the year 1878 was made by the Board, in most cases through the county clerks, in September, 1879. In addition to this there has been a large distribution, in accordance with the law, to "persons interested in or laboring for the promotion of the cause of public health," and the call for the Reports of the Board on the part of this class of persons is rapidly increasing.

The number of copies of the Reports of this Board heretofore printed have not been sufficient to supply all who are named in the law as persons to whom the distribution may be made. Less than six thousand copies are printed, while the officers and members of the 1,228 local boards of health in this State number considerably more than six thousand; and out of the six thousand copies printed, the thousand and more civil officers and other recipients of the joint documents of the State are supplied, as also one hundred and fifty copies for exchanges of the State library, and two hundred copies for incidental distribution from the office of the Secretary of State. It would seem to be in accordance with public policy that a sufficient number of copies should be printed to supply one to each officer or member of a local board of health, besides some for other "persons interested in or laboring for the promotion of the cause of public health." It would also greatly promote a principal object for which the Board labors—the dissemination of sanitary information among the people—if the means at the disposal of the Board were made sufficient to enable it to cause to be made a large number of reprints of some of the articles in its Annual Reports, for distribution in pamphlet form to different classes of persons interested in the subjects of which the particular articles treat. These reprints could economically be made while the type is already set for the Annual Report, and their distribution would in many cases save expense for postage, etc., on the bound volume of the Annual Report, for which they could in many cases be substituted.

CIRCULAR TO SUPERVISORS, PRESIDENTS OF VILLAGES, MAYORS OF CITIES, AND OTHER OFFICERS OF CITIES, VILLAGES, AND TOWNSHIPS RELATIVE TO NOTICES OF DISEASES WHICH ENDANGER THE PUBLIC HEALTH,—DUTIES OF HOUSEHOLDERS, PHYSICIANS, AND OTHERS.

The Legislature of 1879 having amended the law relative to organization, powers, and duties of boards of health in cities and incorporated villages, it became necessary to revise the circular (25) relative to the powers and duties of local boards of health to secure from householders and physicians prompt notice of cases of diseases dangerous to the public health. Accordingly the Board ordered a revision to be made and a new edition to be printed. The revision was made in the office of the Secretary of the Board with the coöperation and advice of the committee on legislation in the interests of public health. For want of funds at the disposal of the Board the publication of the revised circular was delayed till after the close of the fiscal year 1879, and until it could be reprinted from the pages of this Report. It is printed, as Circular 34, on pages 261–8. It was distributed, after the close of the year, to officers and members of township, city, and village boards of health; the prosecuting attorneys of all the counties in the State; to the meteorological observers for the Board; to the regular correspondents of the Board; to the sanitary journals and other exchanges of the Board; to the newspapers in this State; and to other persons interested in public health measures.

CIRCULAR TO HEALTH OFFICERS RELATIVE TO THE WORK OF HEALTH OFFICERS AND OF LOCAL BOARDS OF HEALTH.

The edition of Circular 28, relative to the work of health officers and of local boards of health, having been exhausted, and changes in the law having been made by the Legislature, the Board ordered the circular to be revised and reissued. With the advice and coöperation of the committee on legislation in the interests of public health, it was revised in the office of the Secretary. For want of funds it could not be printed till after the close of the fiscal year and till it could be reprinted from the pages of this Report. It was numbered Circular 35, and is printed on pages 269–278. It was distributed, as soon as printed, to all health officers returned for the year 1879, a copy being sent also, in every case, for each member of the local board of health. It has been planned to answer, and is sent in response to, inquiries which are frequently received as to the duties and powers of local boards of health and of the health officers appointed by them. In connection with Circular 34, pages 261–8, with the paper by Hon. LeRoy Parker, on the Powers and Duties of Local Boards of Health (pages 289–300), with the paper by Mr. Parker on the Duties and Compensation of a Health Officer, and with the paper by Dr. Hitchcock relative to Slaughter-Houses, Rendering-Establishments, etc., it gives much valuable information as to what may rightly be expected of a local board of health and what it should undertake to do.

DOCUMENTS ON RESTRICTION AND PREVENTION OF DIPHTHERIA, AND OF SCARLET FEVER.

Together with other documents distributed, a large number of the documents on the Restriction and Prevention of Diphtheria, and on the Restriction and Prevention of Scarlet Fever, of which the main distribution had previously been made, have been distributed during the year to members and officers of

local boards of health and to other persons interested in the prevention of sickness and deaths.

WEEKLY METEOROLOGICAL REPORTS BY THE OFFICE.

Commencing with the week ending Sunday, June 15, 1879, a weekly summary has been made of meteorological observations taken at the office of the Board. A copy of this summary has been printed in the Lansing Republican, and reprints have been sent every week to the meteorological observers for the Board, to the Chief Signal Officer, at Washington, D. C., and to all persons outside the State who send meteorological data to this office. Copies for each month have also been sent, in connection with the monthly summaries of burials in Lansing, to the health officers of cities with which the Board exchanges mortality statements.

DISSEMINATION OF INFORMATION BY CORRESPONDENCE.

In addition to the replies constantly given from the office of the Secretary to inquiries relative to public health subjects, several papers have been written in consequence of these inquiries, in order to afford a wider dissemination of information on subjects which seemed to be of more general interest. Some of these papers appear in this Report. They are the report on Privies and Water-Closets at Railway Stations, by Homer O. Hitchcock, M. D. (pages 15–24); the report by Dr. Hitchcock on Slaughter-Houses, Rendering-Establishments, etc. (pages 63–80); the report by Hon. Le Roy Parker on the Duties and Compensation of A Health Officer (pages 139–146); the paper by Mr. Parker on The Powers and Duties of Local Boards of Health (pages 289–300); and the report by Henry B. Baker, M. D., on Glanders in Man and in Domestic Animals (pages 301–334). The correspondence of the office has constantly increased since the organization of the Board.

Since moving into the new capitol the number of visitors at the office has greatly increased. Pains are taken to give such visitors as comprehensive ideas as possible concerning the work in which the Board is engaged. Much interest is usually manifested by them, and the cause of public health is advanced in this manner.

REPORT OF THE SECRETARY RELATIVE TO PROPERTY, ETC., FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1879.

To the President and Members of the Michigan State Board of Health:

GENTLEMEN:—In compliance with section 5 of Article II. of the by-laws of this Board, the following report of the "nature and amount of property belonging to the Board, which has been received, issued, expended, and destroyed since the last report, and of the property remaining on hand, and also in whose care each item of property is intrusted," is respectfully submitted:

For an account of the instruments and articles of a similar nature, which were on hand at the time of making the last report, you are respectfully referred to pages xii. of the Third, xxvii.–xxviii. of the Fourth, xl.–xli. of the Fifth, and xxxv.–xxxvi. of the Sixth Annual Report of this Board. Since that time articles of this class have been purchased as follows:—

1 Electrotype plate, Profile of the L. S. and M. S. R. R.
1 Electrotype plate, Profile of the M. C. and the G. R. and I. Rail Roads.
1 Electrotype plate, Profile of the F. and P. M. and the D. and M. Rail Roads.

1 Electrotype plate, Profile of the Saginaw and Mackinaw division of the M. C. R. R., and the D., L. and N. Rail Roads.
1 Electrotype plate, Profile of the G. T., the L. S. and M. S., and the G. R. and I. Rail Roads.
1 Electrotype plate, Temperature Chart, mean winter, summer, and annual temperature.
1 Electrotype plate, Temperature Chart, mean spring and autumn temp.
1 Electrotype plate, Geological Map of the Lower Peninsula of Michigan.
1 Electrotype plate, Chart of Elevations of Surface of Lower Peninsula of Michigan.
1 Electrotype plate, Distribution of woodland and frequency of storm centers in Michigan.
1 Electrotype plate, Rain Chart of Michigan.

The above 11 electrotype plates were prepared and purchased under the direction of this Board and paid for, as a part of the cost of printing and illustrating the Report, out of the general fund of the State.

1 All bristle dust-brush.
3 Electrotype plates, Diagrams 1, 2, and 3, Diseases in Michigan in 1877.
1 Set of seven stereotype plates (pages) of the document upon the Restriction and Prevention of Diphtheria.
7 Electrotype plates illustrating the article on Meteorology of Michigan in 1877; viz.,—
  Diagram I., Average Temperature;
  Diagram II., Average Humidity;
  Diagram III., Average Cloudiness;
  Diagram IV., Rainfall;
  Diagram V., Average Ozone, Day;
  Diagram VI., Average Ozone, Night;
  Diagram VII., Average Atmospheric Pressure.
1 Letter Book,—"H."
1 Dozen Clips.
8 Psychrometers.
3 Wet-bulb Thermometers for Psychrometers.
8 Rain-gauges.
1 Lantern (used in taking the 9 P. M. meteorological observations).
1 Prepared Ribbon for dating-stamp.
1 Automatic oil-tester. Ohio.
1 Agate style for manifolding.
1 Rubber syringe for Battery.
1 Earthen-ware paste-cup.
1 Tin dish for evaporating-pan.
2 Match safes.
2 Pairs shears.
1 Pair scissors.
3 Ivory folders.
1 Brad-awl and handle.
1 Rubber stamp.
1 Thermometer.
1 Hinge lamp burner and chimney.
1 Filler fount lamp.
1 Thermometer for oil-tester.

Bottles and corks for oils,
Excelsior packing,
Lamps and fixtures,
Specimens of oils,
Pan,
Trough and candles,
Nitric acid.
} Used by Dr. Kedzie in his study of the oil subject by request of the Board.

1 Pint lard oil for use in lantern.*

Chloride of lime,
Nitric acid,
Sulphuric acid,
Permanganate of potash,
} Used in ozone experiments.

2 Dozen pamphlet-cases.
1 Letter Book,—"I."
1 Millspaugh's Oil-tester.

The Barometer, Psychrometer, and Maximum, Minimum, and Standard Thermometers intrusted to Henry F. Thomas, M. D., of Allegan, have been returned.

Meteorological Instruments have been placed as follows:—

PSYCHROMETERS in the care of—
Albert Yates, M. D., Washington, Mich.
Rev. A. W. Bill, Menominee, Mich.
J. J. Grafton, Ionia, Mich.
Frank P. Cook, Three Rivers, Mich.
Prof. L. McLouth, Normal School, Ypsilanti, Mich.
Carroll E. Miller, M. D., Cadillac, Mich.
T. J. Langlois, M. D., Wyandotte, Mich.
A. G. Gumaer, Hudson, Mich.
I. N. Mitchell, Hastings, Mich.

Wet-bulbs for Psychrometers, to replace those broken, have been sent to—
Rev. A. W. Bill, Menominee, and
Lee S. Cobb, Nirvana.

RAIN-GAUGES and measuring-sticks have been intrusted to—
J. J. Grafton, Ionia, Mich.
Carroll E. Miller, M. D., Cadillac, Mich.
Frank P. Cook, Three Rivers, Mich.
T. J. Langlois, M. D., Wyandotte, Mich.
A. G. Gumaer, Hudson, Mich.
I. N. Mitchell, Hastings, Mich.
J. E. Fair, Harrisville, Mich.

The Barometer returned by Dr. Thomas was loaned to A. W. Nicholson, M. D., for the purpose of comparing with the one in use by him.

The Electrotype plates illustrating the article on Treatment of the Drowned were loaned to C. L. Chamberlain, M. D., Secretary of the Connecticut State Board of Health, for the purpose of republishing the article in the Annual Report of that Board for 1879.

The Millspaugh Oil-tester is in the hands of Dr. Kedzie.

Books and other publications have been received and placed in the library during the year, or previously (by gift) and not heretofore acknowledged, as follows:—

* Used in taking the 9 P. M. meteorological observations.

By Purchase:—

Influence of Climate in Pulmonary Consumption, by C. T. Williams, M. D.
Michigan Almanac, 1879.
Quarterly Returns of Marriages, Births, and Deaths in England (numbers 109, 110, 111, 119, 120, 121, and 122); Marriages, October to June 1875 1876, and April 1878 to March 1879; Births and Deaths, January 1876 to September 1877, and July 1878 to June 1879.
Encyclopædia Britannica, Vol. IX. (Fal-Fyz).
Library Journal, Vols. I., II., and III. (1876–8).
Michigan State Gazetteer and Business Directory for 1879, Vol. IV.
A Classification and Subject Index, for cataloguing and arranging books and pamphlets of a Library.
Cambridge University Examination Papers in State Medicine for Oct., 1875; June, 1876; Oct., 1876; Oct., 1877; and Oct., 1878.
Twentieth Detailed Annual Report of the Registrar-General of Births, Deaths, and Marriages in Scotland. (Abstract of 1874.)
Annual Report of the Veterinary Department of the Privy Council Office for Great Britain, for the year 1877, with an Appendix.
Report on Sanitary Measures in India in 1876–77; together with miscellaneous information up to June, 1878. Vol. X.
Report of the Royal Commission on Noxious Vapors.
Minutes of evidence taken before the Royal Commission on Noxious Vapors; with an Appendix, 1878.
Special Number of The Sanitary Register. A Record of the Congress and Exhibition held at Stafford by the Sanitary Institute of Great Britain, October, 1878.
The House and its Surroundings, No. 3 of Appleton's Health Primers.
Healthy Houses, by Fleeming Jenkin, F. R. S., Adapted to American Conditions by Geo. E. Waring, Jr.
Twelve photographs of Illustrative Diagrams on the influence of Climate on Phthisis and Rheumatism.
U. S. Official Postal Guide for the fiscal year ending July, 1879.
The Popular Science Monthly, 1879.
Nature, 1879.
The London Practitioner, 1879.
Sanitary Record, 1879.
London Lancet (Monthly), 1879.
Detroit Lancet, 1879.
Van Nostrand's Eclectic Engineering Magazine, 1879.
American Journal of Medical Sciences, 1879.
Medical News and Library, 1879.
Monthly Abstract of Medical Sciences, 1876.
The Sanitarian, 1879.
The New York Medical Journal, 1879.
Scientific American, 1879.
The Sanitary Register, 1879.
Index Medicus, 1879.
Library Journal, 1879.

BY GIFT, EXCHANGE, ETC.:—*

From the Secretary of State, Michigan:—

Fifteenth Annual Report of the State Board of Agriculture, Mich., 1876.

Joint Documents, State of Michigan, 1877, Vols. 1, 2, and 3.

Annual Reports of the Board of State Building Commissioners of Michigan for 1876 and 1877.

First and Third Reports of the State Commissioners and Superintendent of State Fisheries, Mich., 1873–4, and 1877–8.

Report of the State Military Board, Mich., for 2 years, ending September 30, 1874.

Second Annual Report of the Cereal Products of the State of Michigan, 1877–8.

State of Michigan,—Mining Laws of 1877.

The State of Michigan—embracing sketches of its history, position, resources, and industries, compiled by S. B. McCracken.

Report of the State Librarian of Michigan for 1873 and 1874.

Record of Proceedings of the Board of Control of the State Swamp Land Roads, 1867–70.

Annual Reports of the Commissioner of the State Land Office, Mich., for 1870, 1872, 1873, 1874, 1876, and 1877.

Reports of the State Swamp Land Commissioner, Mich., for 1877 and 1878.

Fifth, Sixth, and Seventh Abstracts of the Annual Reports of the County Superintendents of the Poor, Mich. (1875, 1876, and 1877).

Fifth Annual Abstract of Statistical Information relative to the Insane, Deaf, Dumb, and Blind in the State of Michigan, 1877.

Eleventh and Thirteenth Biennial Reports of the Board of Trustees of the Michigan Institution for the Education of the Deaf and Dumb, and the Blind, at Flint (1873–1874 and 1877–1878).

Inventory of the Real Estate and Personal Property of The Michigan Asylum for the Insane, with Statements of Accounts to March 1, 1873.

Reports of Board of Trustees of the Michigan Asylum for the Insane, for the years 1869–1870, 1871, 1871–2.

Report of the Board of Trustees of the Eastern Asylum for the Insane (Michigan), September 30, 1878.

Second and Fourth Biennial Reports of State Commissioners for Supervision of Charitable, Penal, Pauper, and Reformatory Institutions, Mich., 1874, 1877–8.

Fourth and Fifth Annual Abstracts of Reports of Sheriffs relating to Jails in Michigan, 1876, 1877.

Annual Reports of the Inspectors of the State Prison of Mich. for the years 1875, 1876, and 1877.

First and Second Annual Reports of Board of Managers of the State House of Correction at Ionia, Mich., 1877 and 1878.

Fourth Annual Report of Board of Control of the State Public School for dependent children, Mich., 1877.

Twenty-second Annual Report of Board of Control of the State Reform School, Mich., 1878.

Transactions of the Michigan Agricultural Society for the years 1850, 1851, 1852, 1853, 1854, 1858, and 1859.

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*[Documents intended for the Library of the Board may be addressed: LIBRARY OF THE STATE BOARD OF HEALTH, LANSING, MICHIGAN, U. S. A.]

Annual Reports of the Secretary of the State Board of Agriculture for the years 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, and 1874.
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No. 6 (Resolution appointing a Central Finance Committee, June 22, 1871), 7 (Appeal for Money, June 22, 1861), 8 (Letter to Governors of States, asking information as to troops furnished by their States), 10 (Notice of election as Associate Member), 11 (List of Associate Members elected June 26, 1861), 13 (Address of the Central Finance Committee), 16 (Appeal of the Executive Finance Committee in the city of New York), 17[2] (Rules for preserving the Health of the Soldier), 19 (Camp Inspection Return), 19a (Camp Inspection Return), 21 (a Record of certain Resolutions of the Sanitary Commission), 25 (a collection of the papers of the Sanitary Commission), 26 (Notes of a preliminary sanitary survey of the forces of the U. S., in the Ohio and Mississippi Valleys near mid-summer 1861), 28 (Advice as to camping, by the British Sanitary Commission), 31 (Report of a committee on the use of quinine as a prophylactic against malarious diseases), 32 (Report concerning the Woman's Central Association of Relief at New York), 33 (Associate Members of the U. S. Sanitary Commission), 35 (two reports concerning the aid and comfort given by the Sanitary Commission to sick soldiers passing through Washington), 36 (Report on the condition of the troops and the operations of the Sanitary Commission in the Valley of the Mississippi, 3 months ending Nov. 30, 1861), 37 (Report of the Soldiers' Aid Society of Cleveland, Ohio), 39 (Third Report concerning the aid and comfort given by the Sanitary Commission to sick soldiers passing through Washington), 40 (Report to the Secretary of War of the operations of the Sanitary Commission and upon the sanitary condition of the volunteer army, its medical staff, hospitals, and hospital supplies),

41 (Two reports on the condition of military hospitals at Grafton, Va., and Cumberland, Md.), 42 (A visit to Fort Donelson, Tenn., for the relief of the wounded of Feb. 15, 1862), 43 (Letter by the executive committee of the Sanitary Commission to the President of the U. S.), 44 (Report of the operations of the Cincinnati branch of the U. S. Sanitary Commission), 44a (Appeal by the executive committee for money and supplies), 46 (Mortality and sickness of the U. S. volunteer forces, 1861–2), 48 (Appeal by the President, Henry W. Bellows, for money and supplies), 49 (Letter by the President, Henry W. Bellows, M. D., to S. G. Perkins, Esq., communicating request of the executive committee that he study the military, pension, and invalid system of the principal European nations, visiting their most important establishments), 50 (What they have to do who stay at home), 51 (Revised General Instructions for Camp Inspections), 52 (Instructions to General Inspectors concerning certain campaign duties), 53 (Rules of the Central Office), 54 (Appeal for material and labor), 55 (Reports from the Western Department), 56 (Department of Special Inspection of the General Hospitals of the Army; First Report to the Commission, by Henry G. Clark, Inspector-in-Chief, 1862), 57 (Reports on operations of Inspectors and Relief Agents after battle of Fredericksburg, by J. H. Douglass, M. D., and C. W. Brink, M. D., 1863), 58 (Proposed scheme for relief of disabled Soldiers, by John Ordronaux, 1863), 59a (Fourth Report concerning aid and comfort given by the Sanitary Commission to sick soldiers passing through Washington, by Frederic N. Knapp, Special Relief Agent. Second Ed. with Supplement), Supplement to No. 59, (Supplement to Fourth Report (of Dec. 15, 1862) Concerning Aid and Comfort given by Sanitary Commission to sick soldiers passing through Washington, by Frederic N. Knapp), 61 (General order of the Sanitary Commission for its Executive Service), 62 (Rules of the Supply Department), 64 (Second Edition. What the U. S. Sanitary Commission is doing in the valley of the Mississippi), 76 (Preliminary Report of the Operations of the Commission during the present campaign in Northern Virginia, May 24, 1864).

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Opium Habit in Michigan, by Orville Marshall, M. D., (No. 41).

Special Reports of Three Outbreaks of Diphtheria, (No. 42).

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A study of the Climate and Topography of the Lower Peninsula of Michigan, by Henry F. Lyster, M. D., (No. 44).

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Special Reports and Communications to the Michigan State Board of Health, relative to communicable and preventable diseases, (No. 49).
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Table showing the Pulse of patients in the Yellow Fever Hospital, Louisville, Ky., 1878.

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Is Consumption a Preventable disease.

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From Dr. Carl Ernst Helbig:—
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From J. Winthrop Taylor, M. D.:—
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From Perry Averill:—
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The tornado of April 14, 1879, by J. L. R. Wadsworth, M. D., and Francis E. Nipher.

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Health Ordinances of the City of Holland, Mich.: No. 78, Relative to the Public Health; No. 79, Relative to the Office of Health Officer,—Approved March 26, 1877.

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Remarks by Medical Officer to Accompany Mortality Tables of the City of Glasgow, Scotland, for the Quarter ending Dec. 31, 1878, for the year 1878, and for the Quarter ending March 31, 1879, (3 vols.)

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The Mayor's Address with Reports of City Officers of Aurora, Ill., Feb. 28, 1879.

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From Henry P. Stearns, M. D.:—

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Report of a Committee appointed by the Michigan State Medical Society to confer with the Regents and Medical Faculty in respect to the Relations of the Medical Department of the University to the Medical Profession of the State, etc., 1873.

From State Board of Health of Kentucky:—

First Annual Report of the State Board of Health of Kentucky, 1878.

Address on General Sanitation, Prepared by Committee of the Sanitary Council of the Mississippi Valley. Two copies.

From E. Seguin, M. D.:—

Choice of Guides in the use of the Metric System by Physicians and Druggists.

From T. S. Gold, M. D.:—
Twelfth Annual Report of the Connecticut Board of Agriculture, 1878–9.
From J. E. Sanborn, M. D.:—
A Chart of all common Poisons, with the Prominent Symptoms, and full directions for treatment.
A Concise Epitome of Cutaneous Diseases (Chart).
From James S. Reeves, M. D.:—
Transactions of the Kentucky State Medical Society, at Louisville, Oct., 1852.
From J. G. Cabell, M. D.:—
Annual Report of the Board of Health of the Births, Marriages, and Deaths in the city of Richmond, 1878.
From the Chicago Public Library:—
Seventh Annual Report of the Board of Directors of the Chicago Public Library, June, 1879.
From Fred'k H. Seymour:—
Twelfth Annual Report of the Fire Commission to the Common Council of the City of Detroit, year ending January 31, 1879.
From the Woman's Medical College, Chicago:—
The Demand for a Woman's Medical College in the West, by Chas. W. Earle, M. D.
From James C. Bayles:—
Sanitary Tract No. 2, Suggestions concerning the Sanitary care of Premises, by James C. Bayles.
From G. E. Mackay, M. D.:—
First Annual Report of the Board of Health of the City of Buffalo, N. Y., 1878.
From Wm. Paul Gerhard, C. E.:—
Report of the Board of Public Improvements, for the fiscal year ending April 7, 1879, St. Louis, Mo.
The Death-Rate of St. Louis, by Charles A. Todd, M. D.
From Chief Signal Officer, U. S. A.:—
Annual Report of the Chief Signal Officer to the Secretary of War, for the year 1878.
From W. Murray Weidman, M. D.:—
Report of the Board of Health of the city of Reading, Pa., 1878.
From P. Millspaugh:—
Kerosene Accidents, How to prevent them.
From Jno. K. Allen:—
Revised Ordinances of the City of Lansing, 1878.
From S. D. Pond:—
Proceedings of the 5th Annual Meeting of the Michigan State Fireman's Association, 1879.
From Sam'l H. Row:—
Ninth Annual Report of the Commissioner of Insurance, of Michigan, 1878.
From C. H. Hughes, M. D.:—
Reflex Cerebral Hyperæmia, by C. H. Hughes, M. D.
From Gen. W. G. LeDuc:—
Circular Letter from Commissioner of Agriculture of the United States, relative to the manufacture of Maize and Sorghum Sugars.
General Index of Ag'l Reports of the Patent Office for the 25 years 1837–1861, and of the Department of Agriculture for the 15 years 1862–1876.
Investigation of Diseases of Swine, etc.

From Azel Ames, Jr., M. D.:—

Ames Eagle Oderless Excavating Apparatus, Circular.

From W. G. Regester, M. D.:—

Transactions of the Medical and Chirurgical Faculty of Maryland, 1879.

From Chas. E. Davis, M. D.:—

Third, Fourth, Fifth, Sixth, and Seventh Annual Reports of the Board of Health of the City of Boston, 1875–1879.

Sanitary Condition of Boston, Report of a Medical Commission.

From Wm. Marshall, M. D.:—

Circular Letter from the Delaware State Board of Health to Physicians and County and Town Authorities, Advising the Formation of Local Boards of Health.

From James A. Dumont:—

Laws governing the Steamboat Inspection Service, Revised Statutes of the U. S., General Rules and Regulations prescribed by the Board of Supervising Inspectors of Steam vessels, January, 1875. Revised and amended January, 1877, 1878, and 1879.

From A. B. La Rocque, M. D.:—

Report of the Sanitary State of the city of Montreal, 1878.

From Col. Emmons Clark:—

Tenement House Acts of the State of New York, Chapters 908, Laws of 1867, and 504, Laws of 1879.

From Col. Carroll D. Wright:—

Census of Massachusetts, Vols. I., II., and III.

History of the Bureau of Statistics of Labor of Massachusetts and of Labor Legislation in that State 1833 to 1876.

Fifth, Seventh, Eighth, and Tenth Annual Reports of the Bureau of Statistics of Labor, Massachusetts, 1874, 1876, 1877, 1879.

From Wilson Glover:—

The Enameled Sanitary Surface Closet, Circular.

From N. H. Egleston:—

Sanitary Tract, No. 1, of the Citizens' Health Association of the Oranges, Bloomfield, and Montclair, "Rural Hygiene," by Chas. F. Wingate.

Report on the Drainage of Williamstown, Mass., by Col. Geo. E. Waring, Jr.

From Secretary of State, Massachusetts:—

Reports relating to the Registry and Return of Births, Marriages, and Deaths in Massachusetts, for 1859, 1861, 1863, 1864, 1866, 1867, 1868, 1869, and 1872.

From Francis H. Brown, M. D.:—

Arsenical Paper-Hangings.

Index to Boston Medical and Surgical Journal, Vol. C.

From L. H. DePuy, M. D.:—

Revised Charter of the city of Grand Rapids, 1877.

From Secretary of State, Rhode Island:—

Registration Reports of Rhode Island, for 1853–4, 1856, 1857, 1861, 1862, 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1876, and 1877.

From E. A. Chapoton, M. D.:—

Bulletin de Statistique Municipale, Ville de Paris, for 1871, 1872, 1873, 1874, 1875, 1876, 1877, and 1878.

From ——— :—

31st Annual Report Massachusetts School for Idiotic and Feeble-minded youth, 1878.

Annual Journals of the Eclectic Medical Association of Michigan, 1871, 1872, and 1873.

Communications of the Rhode Island Medical Society, with Appendix, containing Proceedings from 1859 to 1877.

Sketch Plans for the Johns Hopkins Hospital, Baltimore.

Reports and Papers relating to Construction and Organization of Johns Hopkins Hospital, No. 2.

First Annual Report State Board of Health of Illinois, 1878.

A Statement of the Theory of Education in the United States of America, by Hon. Duane Doty and W. T. Harris.

The National Bureau of Education; Its History, Work, and Limitations, by Alex. Shiras, D. D.

Second Annual Report of the Board of Control of the Michigan State Public School for Dependent Children, year ending Sept. 30, 1875.

The Boston Athenæum, Tenth Annual Report of the Librarian.

Report of the state of the New York Hospital and Bloomingdale Asylum, 1878.

The Ely Sewer-Stench-Trap.

Fourth Annual Report of the Metropolitan Board of Health, New York, 1869.

Received in Exchange for Publications of this Board the following Periodicals (in some instances incomplete volumes):—

Good Health.
Metal Worker.
Plumber and Sanitary Engineer.
Druggists' Circular and Chemical Gazette.
American Exchange and Review.
Obstetric Gazette.
Physician and Surgeon.
Chicago Medical Journal and Examiner.
Medical Advance.
Ohio Medical Recorder.
American Observer, Medical Monthly.
Michigan Medical News.
American Medical Bi-Weekly.
North Carolina Medical Journal.
Herald of Health, Bloomington, Ill.
Herald of Health, New York City.
Transactions Detroit Medical and Library Association.
Canada Lancet.
Cincinnati Lancet and Clinic.
Monthly Record of the New York Association for improving the Condition of the poor.
New Preparations.
Scientific Farmer.
Science News.
Journal of the Franklin Institute.
Public Health.
Hospital Gazette.

Monthly Weather Review, Signal Service, U. S. A.
Title Slip Registry.

Weekly or monthly mortality statements have been received, with greater or less regularity, during the year past, from Health Officers, Registrars, officers of Boards of Health, and of Cities in the United States as follows:—

Arderlay, John, City Sexton, Lansing, Mich.
Bailey, L. W., M. D., Secretary Health Department, Cleveland, Ohio.
Baldwin, A. S., M. D., Chairman Committee on Vital Statistics, Board of Health, Jacksonville, Florida.
Baylor, Jno. C., M. D., Health Officer, Norfolk, Va.
Boyd, George, Registrar Vital Statistics, Paterson, N. J.
Buckley, Charles, M. D., Health Officer, Rochester, N. Y.
Cabell, J. G., M. D., President Board of Health, Richmond, Va.
Case, Guy B., M. D., Health Officer, Cleveland, Ohio.
Chamberlain, C. W., M. D., Secretary State Board of Health, Hartford, Conn.
Collamore, G. A., M. D., Health Officer, Toledo, Ohio.
Day, Walter DeF., M. D., Sanitary Supt. and Registrar, New York City.
DeWolf, O. C., M. D., Commissioner of Health, Chicago, Ill.
Edwards, T. O., M. D., Health Officer, Wheeling, West Va.
Fisher, A. W., M. D., Health Officer, Toledo, Ohio.
Folsom, Charles F., M. D., Secretary State Board of Health, Boston, Mass.
Furniss, John P., Registrar Vital Statistics, Selma, Ala.
Galt, James D., M. D., Health Officer, Norfolk, Va.
Hague, Will, Registrar Vital Statistics, Paterson, N. J.
Hatch, F. W., M. D., Secretary State Board of Health, Sacramento, Cal.
Herrick, S. S., M. D., Secretary State Board of Health, New Orleans, La.
Hudson, H. S., M. D., Registrar Vital Statistics, Selma, Ala.
Hunter, Wm. H., City Sexton, Lansing, Mich.
LaRocque, A. B., M. D., Medical Health Officer, Montreal, P. of Q.
Lindsley, C. A., M. D., Health Officer, New Haven, Conn.
Lindsley, J. Berrien, M. D., Health Officer, Nashville, Tenn.
Mackay, Gustavus E., M. D., Health Physician, Buffalo, N. Y.
Mattocks, Brewer, M. D., President Board of Health, St. Paul, Minn.
Meares, J. L., M. D., Health Officer, San Francisco, Cal.
Minor, Thos. C., M. D., Health Officer, Cincinnati, Ohio.
Neal, Thos. L., M. D., Health Officer, Dayton, Ohio.
Park, J. P., M. D., City Physician, Knoxville, Tenn.
Pelzer, George S., M. D., Registrar Vital Statistics, Charleston, S. C.
Rezner, W. B., M. D., Health Officer, Cleveland, Ohio.
Scales, T. S., M. D., Health Officer, Mobile, Ala.
Snow, Edwin M., M. D., Sup't of Health and City Registrar, Providence, R. I.
Taylor, B. F., M. D., Secretary State Board of Health, New Orleans, La.
Tobie, Edward, M. D., Health Officer, Buffalo, N. Y.
Townshend, Smith, M. D., Health Officer, District of Columbia, Washington, D. C.
Van Deman, J. H., M. D., Registrar, Chattanooga, Tenn.
Wight, O. W., M. D., Commissioner of Health, Milwaukee, Wis.
Wright, H. P., Registrar Vital Statistics, Chicago, Ill.
Wyckoff, R. M., M. D., Register of Records, Brooklyn, N. Y.

The Weekly Bulletin, issued under the National Quarantine act, by the late John M. Woodworth, M. D., Surgeon-General of the United States Marine

Hospital Service, and by his successor, J. B. Hamilton, M. D., was received while published. Of the National Board of Health Bulletin a few copies have been received. Quarterly and other Reports have been received from various Health Officers of foreign cities, which are acknowledged elsewhere.

Excepting certain publications drawn out by members of the Board, the foregoing, together with those accounted for as in the Library of the Board, and those drawn out by members at the date of the last report, are in the Library of the Board, and in good condition. Those drawn out and not yet returned are as follows:—

By R. C. Kedzie, M. D.:—

Tenth Annual Report Board of Health of Milwaukee, 1876.
Sanitary Record, June 28, 1878. (Periodical.)
First Annual Report State Inspector of Mineral Oils, Ohio, 1878.
Kerosene Accidents, How to prevent them.

By H. O. Hitchcock, M. D.:—

Tyler et al. *vs.* Squires et al. Testimony and Arguments before the State Board of Health of Massachusetts.
Reports of Board of Health of Philadelphia, Pa., 1873 and 1876.
Smith's Nuisance Inspectors.
Second Annual Report Metropolitan Board of Health, 1867.
Second Annual Report, Board of Health, Health Department, New York City, 1871.
Towns and Villages, by Slagg.
Memoirs on Diphtheria, Trousseau and others.
Fourth National Sanitary Convention.
Essays on State Medicine, Rumsey.
Sixth Report Board of Health of Massachusetts, 1875.
Sanitary Legislation in England and New York.
Legislation and Contagious Disease.
Model By-Laws for Sanitary Authorities.
Report Metropolitan Board of Health, New York, 1866.
Report on plans for securing complete and Authentic Records of Deaths and Causes of Deaths in the United States.
Reports and Resolutions relating to Sanitary Legislation presented to the American Public Health Association at Richmond, Va., Nov. 19–22, 1878.
Sanitary Record, Sept. 6, 1878, with supplement. (Periodical.)
American Medical Bi-Weekly, January 18, 1879. (Periodical.)
Ninth Annual Report Massachusetts State Board of Health, 1878.
Fourth Annual Report of the Metropolitan Board of Health, New York 1869.
Hart's Manual of Health.
Third, Seventh, and Eighth Annual Reports Massachusetts State Board of Health, 1872, 1876, and 1877.
Diphtheria and its Treatment, by Davis.
Sanitary Record, May 30, 1879. (Periodical.)
Report of the Health Department of the city of Cleveland, Ohio, 1878.
An Act to prevent the Introduction of Contagious or Infectious Diseases into the United States.
Speech of Hon. Jonas H. McGowan of Michigan on the bill to increase the efficiency of the National Board of Health, in the House of Representatives, May 27, 1879.

Practitioner, June, 1879. (Periodical.)
Prevention of Cholera Infantum and Kindred Disorders.
Suggestions concerning the Sanitary care of Premises. Sanitary Tract No. 2. Bayles.
Sanitary Record, October 18, 1878. (Periodical.)
Ames' Eagle Odorless Excavating Apparatus. Catalogue.
By Hon. LeRoy Parker:—
Rules of the Health Department, New York City, 1873.
Report of Committee on Legislation, American Institute of Homeopathy, 1875.
Equal Allopathic and Homeopathic recognition and representation.
Abstract of Report upon General Health Laws.
Laws of Wisconsin establishing a State Board of Health.
Sanitary Code for Cities.
Detroit Lancet, January, 1878. (Periodical.)
Report of Board of Health of Brooklyn, 1875–1876.
Sixth Annual Report of the Local Government Board, 1876–1877.
Copy of An Act to Prevent the Introduction of Contagious or Infectious Diseases into the U. S. (Public–No. 41.)
Chambers on Public Health and Local Government.
Lectures on State Medicine, Chaumont.
Transactions Am. Pub. Health Ass'n, Vols. I. and II.
Detroit Lancet for April, 1879. (Periodical.)
An Act Supplemental to An Act Creating a State Board of Health. (North Carolina.)
Sanitary Record, May 9, 1879. (Periodical.)
A bill to re-charter the South Carolina Medical Association, and to establish a State Board of Health and to define its duties.
Method for Performing Post-Mortem Examinations. (N. C. State Board of Health.)
By Rev. D. C. Jacokes:—
Report of Mass. Board of Education on a Proposed Survey of the Commonwealth.
Memorandum of the Am. Pub. Health Ass'n, on Legislation Affecting the Public Health.
Circular of Inquiry to School Teachers from the Wisconsin State Board of Health and Circular to County Superintendents transmitting the same.
By Henry F. Lyster, M. D.:—
Elkington on Drainage.
Reid on Ventilation.
Monson's Separate System of Drainage.
Public Health, June 9, 1876. (Periodical.)
By-Laws and Regulations on House Drainage.
Blythe on Public Health.
Parkes on Public Health.
Health and its Conditions.
Plumber and Sanitary Engineer for Oct., Nov., and Dec., 1878. (Periodicals.)
Statement of Objects of Sanitary Protection Ass'n of Newport, R. I.
Statement of Objects of Sanitary Protection Ass'n of Edinburgh, Scotland.
Circular on "Drainage, etc.," from Mass. State Board of Health.
Circular to Local Boards of Health from Mass. State Board of Health on House Drainage.

By John H. Kellogg, M. D.:—
Inspectors' Certificate, Form [A.] Issued by the Sanitary Association of Lynn, Mass.
By Dr. John S. Caulkins:—
Five Senses of Man.
Functions of the Brain.
Superstition and Force.
Godwin on Population.
Germ Theory of Disease. Maclagan.
Stimulants and Narcotics. Anstie.
The Marriage of Near Kin. Huth.
By Dr. Bartholomew:—
Ohio Medical Recorder, May, 1879.
By Otto Kirchner:—
Revised Charter of the City of Grand Rapids, 1877.

Of hard paper, there was on hand, at the time of making the last report, 18 reams and 92 sheets of folio post, 283 sheets of crown, 368 sheets of demy, 267 sheets of blue cover paper, 1 ream of green cover paper, 160 sheets manilla wrapping paper, and 45 sheets blotting paper, besides a quantity of blotters. Since that time there have been purchased 4 reams of folio post, 6 reams of demy, 5 reams of manilla, and 2 quires of impression paper. There is now on hand 10 reams and 414 sheets of folio post, 432 sheets of demy, 33 sheets of blue cover paper, 224 sheets of green cover paper, 1 ream and 452 sheets manilla wrapping paper, 24 sheets of blotting paper. This shows that during the year there has been used 11 reams and 158 sheets of folio post, 283 sheets of crown, 5 reams and 416 sheets of demy, 234 sheets of blue cover paper, 256 sheets of green cover paper, 3 reams and 188 sheets of manilla wrapping paper, and 21 sheets of blotting paper.

This has been used as follows: The folio post has been used in making circulars, printed letters, blanks, labels, and weekly record of diseases books, and for writing paper; the demy paper was used for making sheets for record of diseases dangerous to the public health, for a book in which to record the receipt of weekly report of diseases cards, and for working-blanks for office use; the manilla paper was used for wrapping packages sent out from the office; the impression paper was used for taking copies of manuscript not belonging in the letter book; green cover paper has been used for covers to reprints; blue cover paper has been used for covers to pamphlet copies of the Sixth Annual Report, and for covers to the weekly records of diseases books. The specific items and the amount of paper used for each item may be found in detail in the "Order-Book" of this office.

Of writing paper there was on hand at the time of making the last report 3,139 sheets and half-sheets printed note and letter, 1 ream plain letter, 169 sheets legal cap, 1 ream and 90 sheets foolscap. Since that time there has been purchased 1 ream plain letter, and there have been manufactured from folio post paper furnished by this office 6,980 sheets and half-sheets of letter and note with printed heads. Letter paper has been issued during the year as follows: To Prof. R. C. Kedzie, M. D., 254 whole sheet letter, and 100 sheets half-letter; to Homer O. Hitchcock, M. D., 100 sheets whole letter, 100 sheets half-letter, 100 sheets whole note, and 72 sheets legal cap; to Henry F. Lyster, M. D., 100 sheets half letter, 100 sheets whole note, and 48 sheets foolscap; to Hon. LeRoy Parker, 50 sheets whole note, and 86 sheets

half letter; to Rev. D. C. Jacokes, 50 sheets half letter and 50 sheets note; to John H. Kellogg, M. D., 100 sheets note. There is now on hand about 5,280 sheets of letter, half letter, and note, 1 ream and 25 sheets plain letter, 39 sheets legal cap, 374 sheets of foolscap. This shows that about 4,300 sheets and half sheets of writing paper of different characters have been used in this office.

Of envelopes there was on hand at the time of making the last report about 32,614; 47,750 have been purchased since, making a total of 80,364. There are now on hand about 53,395, thus showing that about 26,969 have been used during the year. Of these 3,883 were used in sending the document on Restriction and prevention of Diphtheria to Physicians and Newspapers in Michigan; about 2,500 were used in sending to the health officers of local boards of health about 1,250 copies of Circular 30 and of Form G, including about 1,250 printed envelopes for return; about 2,500 for sending Circular 31 and Form H, with printed envelopes for return, to clerks of about 1,250 local boards of health; about 1,350 were used in making the distribution of the Fifth Annual Report, and about 3,000 in making the distribution of the Sixth Annual Report; about 3,000 were used in sending the Circular 32 to Supervisors of townships, and Circular 33 and Form E to Mayors of Cities and Presidents of Villages for return of name and postoffice address of health officer; over 2,000 were issued to members of the Board; about 1,500 were used in sending reprints, blanks for weekly reports of diseases, circulars, etc., to correspondents, and furnishing meteorological observers with return envelopes, etc. The remainder has been used in sending out smaller lots of the above mentioned and of other documents, and in carrying forward the general correspondence of the office.

There was on hand, at the time of making the last report, postage stamps, unused postal cards, and postage money to the amount of $84.45. Vouchers for postage and box-rent have been allowed during the year to the amount of $652.39, making a total of $736.84. There is now on hand in postage stamps, unused postal cards, and postage money, $79.10. This shows that during the year the cost of postage and box-rent has been $657.74.

Some of the principal items of postage have been as follows:

Sending out Fifth Annual Report	$74.13
Sending out document on Restriction and Prevention of Diphtheria	38.83
Sending out Sixth Annual Report	124.55
Sending Dr. H. O. Hitchcock's Circular concerning slaughter-houses	1.28
Sending Seventh Registration Report	41.21
Stamped envelopes sent to meteorological observers	7.56
Sending circulars, printed letters, blanks, mortality statements, etc.	82.44
Postal cards printed for report of diseases, receipts to and from this office, etc.	91.25
	$461.25

Thus far this report has given, with exactness or approximation the kind and amount of property received, on hand, and disposed of by this office during the fiscal year ending September 30, 1879; but in order to show how much has been expended for all items of property and for all other expenses during the time specified, the following statement is here presented. It includes vouchers numbers 372 to 452 inclusive.

AMOUNT OF EXPENDITURES BY THE STATE BOARD OF HEALTH, AS PER VOUCHER NUMBERS 373 TO 452, INCLUSIVE.

Chemical Analyses		$10.00
Engraving, Drawing, etc.		180.00
Expenses of Members	Attending Meetings,	150.98
	Other official	189.93
Instruments and Books		173.62
Paper, Stationery, etc.		243.47
Postage	Office	652.39
	Members	15.28
Printing and Binding		659.60
Secretary		2,000.00
Special Investigations		41.40
Miscellaneous		93.39
Total		*$4,410 06

Respectfully submitted,

HENRY B. BAKER,
Secretary.

ENDORSEMENT ON THE FOREGOING REPORT BY THE COMMITTEE ON FINANCES OF THE BOARD.

Having compared the Secretary's annual report of property, received, issued, expended, and destroyed during the fiscal year ending September 30, 1879, with the property book and the record of proceedings, and having examined the foregoing account of expenditures and compared the same with the books in the Auditor General's office, I find the same to be correct.

LE ROY PARKER,
Committee on Finance.

LANSING, Oct. 14, 1879.

ABSTRACTS AND BRIEF ACCOUNTS OF THE PROCEEDINGS AT THE MEETINGS OF THE STATE BOARD OF HEALTH DURING THE YEAR ENDING SEPTEMBER 30, 1879.†

REGULAR QUARTERLY MEETING, OCTOBER 8, 1878.

The Board met at 9 A. M., in the office of the Secretary of State, at Lansing, the following members being present: R. C. Kedzie, M. D., President; Hon. LeRoy Parker; Rev. D. C. Jacokes; and Henry B. Baker, M. D., Secretary. The minutes of the last preceding meeting were read and approved. During the reading of the minutes Drs. Hitchcock and Lyster came in and took their seats as members of the Board.

Dr. Jacokes made a verbal report on the subject of the ventilation of houses and public buildings already constructed. He was to complete his report at the next meeting.

Dr. Lyster, committee on climate, etc., reported the introduction of a paper on the "Climate and Topography of the Lower Peninsula of Michigan," and exhibited numerous diagrams and charts illustrating his paper. The paper was accepted and it was ordered that, when completed, it be published in the Annual Report. [See pages 167–210 of the Annual Report for 1878.]

Hon. LeRoy Parker, committee on legislation in the interest of public health,

*This is for the fiscal year; the amount for the calendar year cannot exceed $4,000, the total appropriation for each calendar year.

† Regular meetings occur on the second Tuesday of January, April, July, and October in each year, commencing at nine o'clock A. M.

read a report on "Coroners and Coroners' Inquests," which was accepted and ordered printed in the Annual Report. [See pages 311–320 of the Annual Report for 1878.]

The committee on that subject not having found any published works suitable for use as text-books on Hygiene in schools, the committee was continued.

Dr. Baker read a report on Public Health Subjects in the proceedings of the State Medical Society. It was accepted with thanks, and ordered published in the Annual Report. [See pages 53–59 of the Annual Report for 1878.] Afterwards, Dr. Hitchcock brought up the subject again, and on his motion the vote ordering the report published was reconsidered, and the part referring to the use of quinine as a preventive in scarlet fever was stricken out. It was voted that the report as amended be printed.

Dr. Kedzie reported back a communication from Dr. J. H. Beech, relative to the subject of Depot Privies, and it was referred to Dr. Hitchcock as committee on disposal of excreta and decomposing organic matter. [Pages 15-24.]

Dr. Baker exhibited Wheeler's Disinfector, manufactured by W. F. Wheeler, 118 South Fourth Street, Philadelphia, Pa., and Houghton's Water Filter, received from E. C. Houghton, 75 Devonshire street, Boston, Mass.

Drs. Kedzie and Baker made a verbal report, as committee on revising the Rules and Regulations for local boards of health, and spoke of some points which it seemed desirable to have amended before reprinting the document. The committee was continued.

In a discussion on the disposal of excreta, Dr. Hitchcock said he had recommended to the health officer of Kalamazoo the purchasing of an Odorless Excavating Apparatus, for the use of the village in cleaning cesspools and privy-vaults. Dr. Baker suggested that a similar general recommendation be made, and said that more harm could be done by cleaning a privy-vault or a cesspool at an improper time or in an improper manner than by letting it remain.

Dr. Baker reported correspondence with Dr. Beech, of Coldwater, and with manufacturers and inventors, looking toward Sanitary Conventions. The committee was continued.

The Secretary read a report of work in office and of duties assigned to him performed during the last quarter.

Dr. Kedzie suggested, and it was so voted, that a complete set of meteorological observations be taken at the office of the Secretary.

Dr. Lyster spoke of the desirability of having meteorological stations established at Adrian, Holland, and South Haven.

The Secretary presented his Annual Report of Property, in accordance with the by-laws of the Board. It was referred to the committee on finances of the Board.

Dr. Lyster presented a communication from a dentist in Detroit relative to the care and preservation of the teeth. After reading it was accepted and ordered published in the Annual Report. [See pages 91–98 of the Annual Report for 1878.]

The Secretary was directed to have the document on the Restriction and Prevention of Diphtheria electrotyped for use by local boards of health.

Dr. Jacokes was allowed 800 copies of the document on the Restriction and Prevention of Diphtheria for distribution.

It was "*Resolved*, That the committee on legislation be instructed to prepare a memorial to the Legislature, urging the Legislature to order a Topo-

graphical Survey of the whole State for Sanitary Purposes, to be instituted at once and carried forward to its earliest completion."

Dr. Hitchcock offered the following resolution, which was adopted:

"*Resolved*, That the committee on legislation be requested to make inquiries relative to the recent act in the Illinois Legislature 'Regulating Medical Practice,' and to its practical working, and report to this Board whether in its opinion a similar act in our own State is desirable." [See pages 45-50 of this Report.]

Dr. Lyster offered a resolution, which was amended to read as follows:

"That this Board organize itself into an examining college, and institute an annual examination of candidates in subjects relating to public health."

The resolution was referred to a special committee consisting of Dr. Lyster and Hon. LeRoy Parker, to be reported upon at the next meeting.

The Secretary was authorized to procure not to exceed ten full page plates for illustrations to Dr. Lyster's article on "Climate and Topography of Michigan."

The Secretary presented a paper by O. Marshall, M. D., on Opium-Eating; and on motion it was accepted with thanks and ordered printed in the Annual Report. [See pages 61–73 of the Annual Report for 1878.]

The Secretary presented a communication from Dr. G. W. Topping, of DeWitt, relative to an Outbreak of Diphtheria. The Secretary was authorized to publish it in the Annual Report. [See page 85 of the Annual Report for 1878.

The Secretary presented two communications relative to diphtheria, and was authorized to publish them in the Annual Report. [See pages 78–84 of the Annual Report for 1878.]

The Secretary then presented the name of one person proposed as a correspondent of the Board. The person named was approved, and the Secretary was directed to ask him to serve.

Dr. Baker was appointed a committee to confer with similar committees from other State Boards of Health, of the American Social Science Association, and of the American Public Health Association, relative to uniform plans for the registration of births, marriages, and deaths in the United States.

The Secretary presented a communication from Dr. A. W. Nicholson, of Otisville, relative to ozone, stating that other communications relative to the same subject had been received from him. The subject was referred to Dr. Lyster, as committee on climate, etc.

It was voted that one hundred copies of the Annual Report be the maximum number allowed to be distributed by any one member of the Board.

Bills were audited,—vouchers 372–387 inclusive.

The Secretary was authorized to have the diagrams illustrating the articles on Weekly Reports of Diseases, and Principal Meteorological Conditions in Michigan, 1877, engraved for the Annual Report.

Hon. LeRoy Parker and Dr. Baker were appointed a committee to present a memorial to the Board of State Auditors asking that the allowance for bill for illustrations for the Annual Report be made from the general fund, as part of the expense of printing the Annual Report.

Dr. Baker was asked to attend the meeting of the American Public Health Association, on behalf of the Board.

Section 1 of Article I. of the By-laws was amended to read as follows:

SECTION 1. The regular meetings of the Board shall be held at Lansing, in the office of the State Board of Health, on the second Tuesday of January, April, July

and October in each year, at 9 o'clock A. M., and the meeting in April shall be the annual meeting.

The Secretary was authorized to employ four clerks during the year commencing January 1, 1879.

On motion the Board adjourned.

REGULAR QUARTERLY MEETING, JANUARY 14, 1879.

The Board met at 9 A. M., in the office of the Board in the new Capitol, at Lansing, the following members being present: R. C. Kedzie, M. D., President; Homer O. Hitchcock, M. D.; Hon. LeRoy Parker; Rev. D. C. Jacokes; and Henry B. Baker, M. D., Secretary.

The minutes of the last preceding meeting were read and approved.

Dr. R. C. Kedzie, committee on foods, drinks, and water-supply, made a verbal report upon the adulteration of sugars and syrups.

Rev. D. C. Jacokes, committee on ventilation, etc., read a paper upon the Importance of Ventilation and Methods of Heating and Ventilating Buildings already Constructed. The paper was accepted with thanks and was ordered to be published, after revision by the author, in the Annual Report. [See pages 51–62 of this Report.]

Dr. R. C. Kedzie, committee on special sources of danger to life and health, made a verbal report upon the subject of illuminating oils, with special reference to oils for general use, and also to a heavy and safe oil known as the "Mineral Seal" oil, designed for use in railroad cars.

It was voted to be the belief of the Board that the interests of life and public safety in this State will be subserved by maintaining the present tests of illuminating oils.

The President of the Board was authorized and requested to make a thorough investigation of the subject of illuminating oils, with reference to legislation, proposed or otherwise, and to act for this Board in endeavoring to maintain the present tests.

Hon. LeRoy Parker, committee on legislation in the interests of public health, made a report upon the subject of the Illinois law regulating the practice of medicine. The report was accepted with thanks and directed to be published in the Annual Report. [See pages 45–50 of this Report.]

Dr. Hitchcock presented a preamble and memorial to the Senate and House of Representatives of Michigan, wherein the State Board of Health petitions the Legislature to enact some law or laws for the protection of the people of this State from the dangers to life and health attendant upon the medical practice of ignorant and unqualified pretenders. After an amendment the memorial was adopted. The Secretary was authorized to procure Dr. Lyster's signature, and after signing for the other members of the Board, transmit it to the Legislature. [The memorial is printed on page 396 of the House Journal (vol. 1) for 1879.]

Dr. H. F. Lyster, in a telegram read by the Secretary, said he was prevented at the last moment from coming, and reported a paper on the Sanitary and Pecuniary value of Reclaimed Overflowed and Saturated Lands. [See pages 233–260 of this Report.]

Hon. LeRoy Parker, as committee on the subject, reported on the proposed memorial to the Legislature asking for a Topographical Survey of the State. At his suggestion the character of the memorial was changed so as to petition for a Sanitary Survey of sufficient scope to include the main facts regarding *water, overflowed* lands, swamps, streams, drainage, water-supply, pollution of

streams, etc. The committee was continued and Dr. Baker was added to the committee.

Dr. H. B. Baker, special committee on a proposed Sanitary Convention at Coldwater, reported that through the death of Dr. J. H. Beech and the ill health of Dr. Cutter no convention could successfully be held there. The committee was discharged from further consideration of the subject.

It was voted that the whole subject be postponed until the next meeting.

Dr. H. O. Hitchcock, committee to draft resolutions relative to the death of Dr. J. H. Beech, reported a preamble and resolution as follows:

WHEREAS, We have heard with deep regret of the death of Dr. J. H. Beech, of Coldwater therefore,

Resolved, That by the death of Dr. Beech this Board has lost one of its most interested and efficient correspondents, and the people of the State have lost one of its most intelligent, earnest, and practical sanitarians.

The preamble and resolution was adopted and the Secretary was directed to transmit a copy to the widow of the late Dr. Beech.

The Secretary presented his report of work done in the office during the quarter past. It was accepted and placed on file.

Reports were presented by the Secretary from Dr. E. N. Palmer, of Brooklyn, Mich., relative to an Outbreak of Diphtheria at that place. The Secretary was directed to edit and publish them in the Annual Report. [See pages 105–111.]

A communication from A. I. Sawyer, M. D., of Monroe, was referred to the Secretary to edit and publish in the Annual Report. [See page 488.]

Rev. Dr. Jacokes presented, verbally, the subject of a millpond in Pontiac which is claimed to be made a nuisance by reason of the refuse thrown into it from the Asylum for the Insane.

On resolution of Hon. LeRoy Parker, Section 1 of Article V. of the By-Laws was amended to read as follows:—

SECTION 1. The order of business at regular meetings shall be as follows:—

1. Calling the roll.
2. Reading of minutes of last meeting.
3. Brief announcement of business to be brought before the Board.
4. Communications by the President.
5. Communications by the members.
6. Communications by the Secretary.
7. Introduction of new business.
8. Auditing of bills and accounts.
9. Reports of standing committees.
10. Reports of special committees.
11. Miscellaneous business.

The following resolution proposed by Dr. Hitchcock was adopted:—

Resolved, That the Secretary be requested immediately to forward to the appropriate committee, all communications, addressed to the Board, which relate to the work of the regular committees, to be considered and reported upon by such committee at the next meeting of the Board.

It was voted to be the duty of a member who is unable to attend the meeting of the Board to forward to the Secretary, at least one day previous to the meeting all communications which may have been referred to him by the Secretary in accordance with the foregoing resolution.

The Secretary presented the name of a person proposed as a regular correspondent of the Board, and the proposal was approved.

The Secretary presented the Rules and Regulations of the Board of Public Works of the city of Grand Rapids, relative to the tapping of drains or sewers; also a letter from A. C. Sekell, City Surveyor, relative to providing penalties for violation of the regulations.

gent upon, and thoroughly alive to, the interests of this Board, and earnestly desirous to aid in the most efficient and practical accomplishment of its labors.

Resolved, That these resolutions be spread upon the minutes.

(Signed) H. O. HITCHCOCK.
LEROY PARKER.

The Secretary was authorized to purchase four psychrometers and four rain-gauges for use of the meteorological observers for the Board.

The Secretary was directed to send to each officer of a local board of health and ascertain the number of copies of each Annual Report of this Board in his possession.

One hundred and fifty copies of each Annual Report was made the maximum number which each member of the Board was allowed to distribute.

The Secretary was authorized to compile, from year to year continuously, the annual reports of diseases, made by the correspondents of the Board.

It was decided that such matter as was not used by the committees or not properly referable to committees should, if useful, be used in making the first part of the Report.

The Secretary presented copies of three new laws passed by the Legislature of 1879, the bills having been presented by action of Hon. LeRoy Parker, committee on legislation in the interests of public health. Of these laws, one provides that the council of each city and village shall be a board of health, unless another board of health is organized under the city or village charter; one authorizes local boards of health to offer free vaccination to the inhabitants within their jurisdictions; and the other makes it the duty of the health officer of a city to notify the prosecuting attorney of any neglect by physicians or householders to report cases of diseases dangerous to the public health.

The Secretary presented a communication from H. Peters, M. D., asking that a sanitary convention be held at Tecumseh.

The Secretary was instructed to revise and print a new edition of the circular (No. 7) of questions relating to the water-supply of localities in Michigan.

The Secretary presented a list of names of persons proposed as regular correspondents of the Board. The persons proposed were approved.

Dr. Baker presented the following resolution, which was adopted:

Resolved, That this State Board of Health tenders to Hon. Jonas H. McGowan, member of Congress from Michigan, a hearty vote of thanks for his labors for the promotion of the public health, in presenting and advocating in Congress the bill which is now a law, establishing a National Board of Health.

The Secretary presented a suggestion by B. B. Ross, M. D., of East Saginaw, that the health officer should verify the diagnosis of each case of communicable disease reported to him; also a suggestion by himself, that provision should be made requiring the health officer to act promptly for the restriction of any communicable disease reported to him and verified. Both suggestions were referred to Hon. LeRoy Parker, committee on legislation in the interests of public health.

The Secretary was directed to prepare a circular to health officers containing references to the new laws; and when it was prepared to send the plan to members for approval, and if approved, to have not to exceed ten thousand copies printed. [See pages 269–278.]

A communication from E. S. Richardson, M. D., relative to the verification of diagnosis of diseases by the health officers, was referred to Hon. LeRoy Parker.

The Secretary was authorized to purchase books for the use of the Board, at a cost not exceeding fifty dollars in each year.

Replies by correspondents relative to erysipelas and puerpural fever, presented by the Secretary, were referred to H. O. Hitchcock, M. D., committee on epidemic, endemic, and contagious diseases. [See pages 131–134.]

The Secretary presented a communication from Hon. C. D. Randall, of Coldwater, recommending the examination of plans of State buildings, by the State Board of Health, relative to site, systems of ventilation, drainage, etc.

A communication from H. T. Calkins, M. D., of Petoskey, was referred to Hon. Le Roy Parker. It was relative to the taking of the U. S. Census by Correspondents of this Board.

Henry F. Lyster, M. D., was requested to attend, on behalf of this Board, the meeting of the State Medical Society, at Detroit.

R. C. Kedzie, M. D., was asked to attend for this Board the meeting of the American Medical Association at Atlanta, Ga. [See pages 25–44.]

The Secretary presented his quarterly report of work done in the office.

The Secretary was authorized to have the journals and periodicals bound, at his discretion.

The Secretary was authorized to replace with Lee S. Cobb, meteorological observer for the Board at Nirvana, a wet-bulb thermometer in place of one lately broken.

The Secretary was authorized to purchase three wet-bulb thermometers.

The Secretary presented a communication from the Massachusetts State Board of Health, relating to the inheritance of pathological conditions, and a communication from the U. S. Commissioner of Education, Hon. John Eaton, enclosing a communication from William M. Evarts, Secretary of State, giving notice of five hundred pounds as a prize for the best essay on Hydrophobia, its nature, prevention, and cure, offered by the Royal College of Physicians, of London, England.

A communication from J. A. Russell, M. D., of Edinburgh, Scotland, enclosing a plan of the Sanitary Protection Association of Edinburgh, was referred to Dr. Henry F. Lyster.

Bills were audited,—vouchers 406–426 inclusive.

The Secretary was authorized to purchase a Foster cup oil-tester, the Ohio oil-tester.

H. F. Lyster, M. D., committee on drainage, etc., reported that he had prepared the plan of a circular on House-drains, Sewers, etc., as requested.

The Secretary was directed to add his suggestions to the plan and send it to the members for corrections, suggestions, and approval before publication.

Dr. H. F. Lyster also reported a paper on the reclamation of low or saturated lands. Dr. Lyster was thanked for the paper, requested to complete it, and it was voted to publish it, when completed, in the Annual Report. [See pages 233–260.]

Dr. Lyster was requested to visit Bay county with reference to Judge Miller's work in reclaiming low ground, and Gratiot county in reference to the overflowed lands caused by flooding the rivers for the purpose of floating off logs, about which much complaint has been made to this Board.

Dr. R. C. Kedzie said he had received a letter from Dr. Edwin M. Snow, of Providence, concerning the test for lead on tin-plate, and that he desired to give an additional point to be followed in testing for lead by his method. It was to add a drop of water to the spot moistened by nitric acid, after the spot has become dry, before dropping on the iodide of potassium. [The test is printed on page 29 of the Report for 1878. As amended above, it is as follows:—

TEST FOR LEAD IN TINWARE.—Place a drop of strong nitric acid on the tin surface, by means of a glass rod or even a splinter of wood, and rub the acid over a space as large as a dime; warm it very gently until it is dry; add a drop of water, and then drop two drops of a solution of iodide of potassium on this spot; the bright yellow iodide of lead will form on this spot if the tin contains lead. This test can be very rapidly applied and its results are decisive.]

In reply to a question by H. F. Lyster, M. D., Dr. Baker, committee on death-rate, presented reports by Dr. W. H. Rouse, of Detroit, showing an increase of population and a decrease of the death-rate. He attributed the decrease of death-rate from diseases believed to be preventable, somewhat to sanitary work. Also that the deaths from small-pox were decreasing owing, he thought, to the effective vaccination recommended by Dr. Lyster and others.

Hon. LeRoy Parker, committee on legislation, reported that three bills prepared by him by request of the Board, had become laws; two bills, one relative to an improved system of coroners' inquests, and the other, having been prepared in conjunction with the Secretary, relative to an improved method of collecting vital statistics, were still before the Legislature.

Mr. Parker, for the committee appointed to prepare and present a memorial to the Legislature asking for a sanitary survey, reported that owing to the pressure of other work, and the very great labor required to perfect the details of the work, the committee had been unable to present the subject to the Legislature. He recommended a committee on sanitary survey to whom all papers bearing upon the work should be referred, and which should be charged with the preparation of schedules of questions to be used in such survey.

There being two vacancies on the Board, that part of the by-laws which requires the appointment of the standing committees at the April meeting was suspended and the appointment deferred until the July meeting.

A standing committee of three members on sanitary survey was ordered, and the President stated that the membership of the committee would be announced at the July meeting.

The Secretary read a list of communications which had been referred to the committees previously to the last quarter and still remained unreported upon. The list was as follows:

REFERRED TO R. C. KEDZIE, M. D.:—
Letter from Robert Johnston, M. D., dated Dec. 17, 1877, concerning an illuminating fluid.
Letter concerning the Document on the Restriction and Prevention of Diphtheria, from R. C. Kedzie, M. D.
REFERRED TO HENRY F. LYSTER, M. D.:—
Letter from Wm. F. Jenison, relative to drainage.
Letter from A. W. Nicholson, M. D., relative to ozone and ozone observations in pine forests.

The following communications had been referred by the Secretary since the last meeting of the Board:

TO R. C. KEDZIE, M. D.:—
Postal from H. C. Clapp, M. D., of Mendon, relative to bad water and typhoid fever. [See pages 134-6.]
Letter from Perry Averill, relative to the burning of a child. (Returned by Prof. Kedzie, having been used in his address before the Legislature.)
TO HOMER O. HITCHCOCK, M. D.:—
Postal card from W. W. Switzer, M. D., relative to bad water, and three cases of typhoid fever, and causation of diphtheria. [See pages 123-124.]
Letter to Dr. Kedzie from S. P. Tracy, relative to saw-dust and mill-refuse in streams.
Letter from J. D. Johnson, sending petition against allowing saw-dust to flow into Fyfe Lake.
Letter from C. W. Marvin, M. D., being a study of an outbreak of diphtheria in Gratiot Co. [See pages 111-115.]
TO HON. LEROY PARKER;
Report upon the Illinois Medical Practice Act, read at the meeting of the Board, Jan. 14, 1879. [See pages 45-50.]
TO HENRY F. LYSTER, M. D.:
Letter from Joshua Miller, relative to flooding Chippewa River for driving logs.
Letter from Daniel F. Swain, Hungerford, relative to cutting a dam.
Letter from Wm. F. Jenison, Eagle, relative to drainage.
Letter from J. Van Zandt, relative to the dam on Lincoln Lake. [See pages 236-7.]

Dr. Kedzie reported that he had addressed the Legislature on the subject of illuminating oils, and met with considerable opposition. A bill abolishing the chill-test and lowering the flash-test to 120° passed the House and the Senate had replaced the chill-test and changed the plan of inspection districts. It was not certain what would be the result. It was voted to refer all correspondence, papers, etc., bearing on the subject of illuminating oils, to Dr. Kedzie for use in preparing his annual address. [See pages 1–14.]

Dr. H. F. Lyster, for the committee on examinations in sanitary science, made a verbal report, and by vote Dr. Lyster was requested to present a plan and list of questions at the next meeting of the Board. [See pages 509–512.]

The Secretary was directed to procure for each member of the Board, a set of questions used in foreign countries in examinations in sanitary science.

Hon. LeRoy Parker presented his report upon the Illinois Medical Practice Act, and it was accepted and ordered published in the Annual Report. [See pages 45–50 of this Report.]

It was voted that two sanitary conventions be held in the winter of 1879–80. Drs. Hitchcock, Lyster, and Baker were appointed a committee to manage the details of these conventions.

The Secretary presented a communication from W. H. H. Knapp, president of the board of health of Riley, Clinton Co., relative to diphtheria. It and the reply already made by Dr. Baker were referred to H. O. Hitchcock, M. D., committee on epidemic, endemic, and contagious diseases. [See pages 117-19.]

On motion the Board adjourned.

REGULAR QUARTERLY MEETING, JULY 8, 1879.

The Board was called to order at nine A. M., in the office of the Board, at Lansing, the following members being present: R. C. Kedzie, M. D., President; Homer O. Hitchcock, M. D.; Hon. Le Roy Parker; Rev. Daniel C. Jacokes; John H. Kellogg, M. D.; Henry B. Baker, M. D., Secretary.

The minutes of the last preceding meeting were read and approved.

The President reported that owing to his absence from the State and other reasons he had as yet been unable to write his annual address. He gave, however, by request of the Board, an outline of his address, and was authorized to write and hand it in to the Secretary after the meeting. [See pages 1–14d.]

The Secretary read a brief announcement of business he desired to bring before the Board.

Dr. R. C. Kedzie presented a letter from Theo. H. Monk, of the Meteorological Office, Toronto, Ont., relative to adopting the system of health and weather observations used by this Board.

Dr. Baker presented a communication from Dr. Squire, Secretary of the Epidemiological Society of London, England, expressing interest in the work of this Board, especially in the restriction and prevention of scarlet fever and diphtheria. Because of a statement concerning the persistence of the contagium in scarlet fever, the communication was referred to Dr. H. O. Hitchcock, committee on epidemic diseases, etc.

Dr. R. C. Kedzie mentioned having received a letter from Mr. Avery, of Baltimore, which stated that a thin electro-plating of silver on tin utensils would prevent poisoning thereby.

The Secretary presented the subject of diseases of animals as relates to public health. He mentioned a petition asking the Governor to appoint a com-

mission to act with reference to the Texan cattle disease and other diseases of animals; also a letter from A. J. Murray, V. S., of Detroit, on the subject; also a letter from John S. Billings, M. D., expressing his hope that the Board would act in this direction.

It was voted that there be appointed a standing committee on "diseases of animals in relation to public health," and that all papers and communications the subject be referred to that committee.

The Secretary read his quarterly report of work done in the office.

Dr. Baker presented the subject, and it was voted that health officers be asked to report hereafter the cause of fires.

Rev. D. C. Jacokes presented a resolution, which, after amendment, was adopted as follows:

That the Secretary be authorized to prepare and issue circulars on special subjects to a large number of persons; provided such circulars are approved by a majority of the members of the Board, and provided further, that such circulars be not issued until after the close of the appropriation year 1879.

The Secretary presented the analysis of drinking-water, sent by Dr. H. C. Clapp, of Mendon, and supposed to have caused typhoid fever, made by Dr. R. C. Kedzie. The whole subject was referred to H. O. Hitchcock, M. D., committee on epidemic, endemic, and contagious diseases. [See page 136.]

The Secretary was authorized to print the President's address and other papers ordered published in the Annual Report for 1879 as fast as practicable.

Dr. Baker announced the meeting of the American Social Science Association at Saratoga, and Hon. LeRoy Parker was asked to attend on behalf of this board.

The Secretary presented a sanitary tract on the prevention of cholera infantum, and suggested the preparation of something similar for the Annual Report for 1879. It was referred to H. O. Hitchcock, M. D., committee on epidemic, endemic, and contagious diseases.

A list of names of persons proposed as regular correspondents of the Board was read, the proposal approved, and the Secretary directed to ask them to accept.

The Secretary presented several communications and reports from E. N. Palmer, M. D., of Brooklyn, Mich., relative to an outbreak of diphtheria in that village and vicinity. They were referred to H. O. Hitchcock, M. D. [See pages 105–111.]

It was voted that the replies of regular correspondents on Water-Supply should be printed in the Annual Report. [See pages 279–288.]

A circular on Drainage, issued by the Massachusetts State Board of Health, was referred to H. F. Lyster, M. D.

The Secretary presented Rules and Regulations of the Sanitary Association of Lynn, and a communication from H. R. Storer, M. D., relative to the Sanitary Protection Association of Newport. The subject of the formation of such associations was discussed, and the following resolution was passed: *Resolved*, That this State Board of Health heartily favors the organization of Sanitary Associations auxiliary to local boards of health.

The Secretary presented circulars from the National Board of Health, and a communication from the President of the National Board requesting that this board present its views on a national health service. Dr. Hitchcock was appointed a special committee to prepare a plan for a national health service, and to submit it to the members of the Board for their approval and signatures.

The President presented the subject of the reorganization of the standing committees. The by-laws were amended as follows: Committees Nos. 5 and 10 were consolidated, and entitled, "No. 5. Climate, geology, topography, and vegetation, in their relations to health." Committee No. 8 was so amended as to be entitled, "8. Occupations, recreations, and habits in relation to health."

The new standing committee on sanitary survey was made No. 10. Section 2 of Article III. of the by-laws is therefore practically amended to read as follows: "Sec. 2. Standing committees, except No. 10, on sanitary survey, shall each consist of one member."

A new committee, previously voted, was entitled "No. 15. Diseases of animals in relation to public health."

The standing committees as reorganized were appointed as per list on pages vii–viii of this Report.

At two o'clock Henry F. Lyster, M. D., came in and took his seat as a member of the Board.

Bills were audited—vouchers 427–452 inclusive.

Hon. LeRoy Parker, committee on finances of the board, reported that the appropriation for 1879 was nearly exhausted.

The order given the Secretary at the last meeting requiring him to ascertain how many Reports of this Board were in the hands of each officer of a local board of health was suspended.

Dr. Hitchcock, committee No. 1, reported having received from the Secretary, since the last meeting, the following communications which had been referred to him:

A letter and two maps from C. W. Marvin, of Ithaca, relative to an outbreak of diphtheria. [See pages 111-115.]

Communication from R. B. Smith, M. D., concerning erysipelas and puerperal fever. [See pages 131-2.]

Letter from W. H. H. Knapp, relative to diphtheria. [See pages 117-9.]

Communication from Dr. Milton Chase, relative to diphtheria at Otsego. [See pages 119-121.]

Communication from Mrs. M. J. Williams on the causation of diphtheria. [See pages 122-3.]

Replies by L. W. Bliss, concerning erysipelas and puerperal fever, and Dr. Herig's letter transmitting the same to this office. [See page 132.]

Communications from W. H. Rouse, M. D., concerning erysipelas and puerperal fever. [See pages 132-3.]

Letter and map from C. W. Marvin, relative to an outbreak of diphtheria. [See pages 111-115.]

Commmunication explaining map mentioned above.

Communication from H. C. Clapp, M. D., relative to sickness simulating typhoid fever, supposed to have been caused by bad water. [See pages 134-6.]

Communication from F. Goodwin, M. D., relative to transmission of diphtheria by milk. [See page 121.]

Communication from C. W. Marvin, explaining a map of the diphtheria district N.E. of Ithaca.

Communication from E. P. Christian, M. D., relative to authority for killing a horse with the glanders. [See pages 303-4.]

Copies of two communications relative to cases of sporadic cholera and typhoid fever in Bridgehampton township, Sanilac county. [See pages 136-7.]

Henry F. Lyster, M. D., reported having received the following communications referred to the committee on sewerage and drainage:

Letter from George Miller, health officer of Warren township, Midland county, complaining of water in ditches along the F. & P. M. R. R., with a copy of Dr. Baker's reply to same.

Communication relative to flooded lands in Gratiot Co., from P. R. Phillips.

Communication relative to the same subject from Seneca Sly.

Communication relative to the same subject from Roswell Danley.

Dr. R. C. Kedzie, as committee, reported having received a communication from the Secretary relative to the poisoning of a man by drinking lemonade sold from a zinc water-cooler, and said the poisoning was caused by a salt of zinc formed by the action of the acid of the lemon on the zinc in which it was contained.

Dr. Kedzie also reported having analyzed the sample of water from Mendon, suspected of being the cause of cases of sickness simulating typhoid fever, and said he had presented his statement of the analysis to the Secretary. [See page 136.]

Dr. H. O. Hitchcock, committee on disposal of excreta, etc., presented a

paper on Depot Privies. The paper was accepted with thanks and ordered published in the Annual Report. [See pages 15–24.]

The Secretary was authorized to procure, without expense, cuts to illustrate sanitary appliances mentioned in Dr. Hitchcock's paper.

Dr. Hitchcock also presented an outline of a report, which he proposed to present at the October meeting, on Slaughter-Houses.

Dr. Hitchcock reported having received from the Secretary a communication from E. C. C. Kellogg relative to a foul railroad privy; also, as chairman of the Sanitary Convention committee, a communication from Charles L. Marsh relative to the methods adopted by the Sanitary Institute of Great Britain.

As Dr. Hitchcock desired to leave, the order of business was suspended, and he made a report, as chairman, for the committee on sanitary conventions. The report was generally discussed, and it was voted that the committee should secure the attendance at the conventions in Detroit and Grand Rapids of prominent sanitarians from abroad, and correspond with manufacturers of, and agents for, sanitary apparatus and appliances, relative to placing their wares on exhibition. The report of the committee was then adopted.

The committee was directed immediately to prepare the programs for the sanitary conventions at Detroit and Grand Rapids, to notify the persons expected to read papers, correspond with persons expected to exhibit sanitary appliances, and to report the program at the October meeting of the Board.

The regular order of business was resumed.

Dr. R. C. Kedzie, committee on poisons, etc., reported a letter from A. Nash, M. D., of Lapeer, containing a sample of red flannel which had caused sickness by wearing it. Dr. Kedzie said the flannel was colored with aniline in which arsenic was used, and the flannel also contained in its meshes a salt of tin used as a mordant; also that, except by chemical examination, there was no manner of distinguishing the difference between flannel so colored and that which is harmless.

Hon. LeRoy Parker, committee on legislation relative to public health, reported a letter from Edward Batwell, M. D., of Ypsilanti, relative to bringing suit in certain cases bearing on public health, and read a reply he had prepared to the same. The report was accepted with thanks and referred back to Mr. Parker for revision and extension and ordered published in the Annual Report. [A paper on the general subject of the Powers and Duties of Local Boards of Health, written in part with reference to this case, is printed on pages 289–300 of this Report.]

Mr. Parker also reported on a letter referred to him from H. T. Calkins, M. D., relative to the taking of the U. S. Census. The report was accepted with thanks.

Mr. Parker also stated that he had investigated the subject of the authority of local boards of health to kill horses sick with glanders, and would present a report on that subject at the next meeting. [Incorporated in his paper on page 300; see also page 333 of this Report.]

Hon. LeRoy Parker and Dr. H. B. Baker were appointed a committee to confer with the Board of State Auditors relative to the allowance from the general fund of bills for illustrations in the forthcoming Annual Report.

Dr. R. C. Kedzie read his report as committee to attend the meeting of the Sanitary Council of the Mississippi Valley at Memphis and Atlanta, and the meeting of the American Medical Association at Atlanta May 6, 1879. The

report was accepted with thanks and ordered printed in the Annual Report. [See pages 25–44.]

Dr. H. F. Lyster reported his attendance, by request of the Board, at the meeting of the Michigan State Medical Society at Detroit. He stated that at that meeting he presented a paper giving an outline of the work of this State Board of Health since its organization.

Dr. Lyster made a report as a special committee on examinations, by this Board, in sanitary science. The report was accepted with thanks, and it was voted to transmit a copy of the written portion of his report to each member of the Board to be reported on by each member at the next meeting of the Board. [For introduction of this subject, see page xlv.; for plan adopted, see pages 509–512 of this Report.]

The Secretary was authorized to procure illustrations for the articles on Meteorology of Michigan, 1878, and Weekly Reports of Diseases, 1878, in the forthcoming Annual Report.

The Secretary was directed to reply to the Secretary of the Sanitary Association of the Mississippi Valley, that it was deemed inexpedient to make a detailed report from this Board.

The following resolution was adopted:—

Resolved, That this State Board of Health heartily favors the organization of sanitary associations auxiliary to local boards of health.

A communication from Phil Porter, M. D., health officer of Jackson, relative to decomposing organic matter in Grand river, was referred to Dr. H. O. Hitchcock.

Dr. R. C. Kedzie was appointed a special committee to revise the Rules and Regulations recommended by this Board for adoption by local boards of health, and to utilize in such revision similar rules applicable to individuals as well as to local boards of health, issued by the Sanitary Council of the Mississippi Valley.

On motion the Board adjourned.

SPECIAL REPORTS, COMMUNICATIONS, ETC.

In addition to the communications, the receipt of which have been reported, the following communications have been referred to committees from this office:

To R. C. Kedzie, M. D.:

Two letters from Fred'k H. Seymour, Secretary Detroit Fire Commission, relative to fires in Michigan caused by kerosene oil. [See page 9.]

Letter from H. A. Hutchins relative to the standard of "headlight" oil. [In this Report.]

Letter from F. W. Green, State Oil Inspector, Ohio, relative to use of the Foster cup.

Two letters from Hon. J. Sarnighausen relative to the Indiana oil law.

Two leters from O. B. Campbell, M. D., relative to a lamp explosion near Ovid. [In this Report.]

Letters from Perry Averill, State Oil Inspector, Mich., relative to burning of Mrs. Cummings' cottage in Detroit, and from Deputy Inspector Willetts, through Mr. Averill, relative to burning of the Sherman House at Flint. [In this Report.]

Letter from P. Millspaugh relative to the Millspaugh oil-tester.

Letter from Walter G. Elliot, C. E., relative to the "S. S. Mann Lamp Gun," with sectional view.

To H. O. Hitchcock, M. D.:

Letters and newspaper clipping from H. L. Joy, M. D., and B. A. Gallup, M. D., relative to scarlet fever in Marshall.

To H. F. Lyster, M. D.:

Correspondence between Dr. Lyster, Dr. Wellington Carleton, and the Secretary of this Board relative to cases of diabetes.

These communications have all been returned and placed on file in the office for future reference. Some of them are printed in this Report.

ABSTRACTS FROM ANNUAL REPORTS BY HEALTH OFFICERS AND CLERKS OF LOCAL BOARDS OF HEALTH.

Some of the health officers and clerks of local boards of health in their annual reports to this office for the year 1878, made very full reports or mentioned interesting circumstances in connection with the prevalence of diphtheria, scarlet fever, or typhoid fever within their jurisdiction, abstracts of which it has been thought best to publish here. The returns by clerks and health officers were not yet complete and generally representative enough to make a very instructive compilation for the State or by counties.

J. W. Griswold, clerk of the board of health of London township, Monroe county, reported that according to his best knowledge and belief no diseases dangerous to the public health existed which were not reported to him. He reported 25 cases of diphtheria, none proving fatal; 400 cases of whooping-cough, two being fatal. The local board resolved to close every school and prohibit all public gatherings in the township.

W. H. Eely, health officer, and J. J. Littlejohn, clerk of the board of health of the township of Pineplains, Allegan Co., reported in detail 32 cases of diphtheria, four of which were fatal. The details are for each case, the name, age, and sex of the person sick, date taken sick, whether recovered, living or died, date of death or recovery, date when the facts were furnished for record, and by whom furnished. The disease (first case) was contracted at Allegan. The reported unsanitary conditions were—for one case, proximity to a millpond where there was decaying vegetable matter; for another, drinking water from a well tightly covered and unused for three months previous; for four cases of same surname and probably same family, bad ventilation or too large a family crowded into a small house. The local board of health ordered the disinfection of school-house privy-vaults, and advised the quarantine of cases of diphtheria. The disease was present from August till December.

Amos G. Chase, M. D., health officer of Ada township, Kent Co., reported 18 cases of diphtheria, 13 in detail, and five as not having been reported to him. Two cases were fatal. He does not know the source of contagion or infection, and the board of health had held no meeting. The disease was present at the time of making the report. Dr. Chase states that he does not know the origin of the diphtheria which he reported for 1878. But for 1877 he reported 51 cases of diphtheria (33 of them in detail and 18 as not having been reported to him in detail) in Ada township, and stated that previously to its outbreak there, 'it had been raging since June with fearful mortality in Grand Rapids city, ten miles from us.' It is at least possible that the diphtheria which occurred in 1878 was derived by contagion from that of 1877. From Plainfield, Cannon, and Algoma townships, also, adjoining or near Ada township, diphtheria was reported in January and February, 1878. See pages 378-381 of the Annual Report of this Board for 1877.

William Erity, health officer, and E. S. Blakeslee, clerk of the board of health of Southfield township, Oakland Co., reported 19 cases of diphtheria, including two deaths. No meeting of the board was held during the year. Mr. Blakeslee states "The supposed cause of the diphtheria reported was impure water—the locality is rather low land and during the dry weather this sickness occurred. As the water in the wells was principally surface water, the theory seems plausible."

If diphtheria is, as it is now believed to be, a specific contagious disease, the above "theory" however "plausible" will require for its establishment much stronger evidence than the many such coincidences which have been observed.

I. W. Badger, M. D., health officer of the city of Big Rapids, reported 32 cases of diphtheria, including one death; and stated that the diphtheria was of a milder type than that reported in other portions of the State. The board of health had no meetings which he attended.

H. J. Hale, M. D., health officer of the village of Grass Lake, Jackson Co., reported 26 cases of diphtheria, including eight deaths. The disease was brought in by a visiting family from the West. The well children were allowed to attend school, and from these, he stated, it spread. He thinks if the school had been promptly closed the disease might have been stamped out. A. T. Lawrence, clerk of the board of health, reported these cases in detail. From his record, it appears that five cases were reported in January, 1879. He reported a woman 60 years old, another 45 years old, and a man aged 30 as having the disease, the illness lasting five, six, and fourteen days respectively. The disease was prevailing when the reports were made, the board of health apparently making no effort to stop its spread.

Dr. Asa K. Warren, health officer of Olivet village, Eaton Co., reported 40 cases of diphtheria, eleven of which were fatal. The board of health met five times during the year, and adopted a series of rules for the government of the board.

Dr. Walter H. Bills, health officer of Allegan, reported in detail 26 cases of diphtheria, five being fatal, and 15 cases of scarlet fever, none fatal. In regard to diphtheria he states that it "originated in an old house standing upon the banks of a stagnant pond, and nearly all the other cases originated from contagion direct." The source of contagion or infection of the scarlet fever is unknown. He also reported one case of typhoid fever in a family which "used water from a well situated only 30 feet from an old privy-vault."

S. S. Messenger, M. D., health officer of Oneida township, Eaton Co., reported 38 cases of scarlet fever, none fatal. He states that many of the cases were isolated, and in many cases one or two members only were affected, the remainder escaping. The board of health met twice during the year, ordered the schools closed, and recommended strict sanitary measures.

J. W. Thomas, clerk of the board of health of Keeler township, Van Buren Co., reported 14 cases of scarlet fever, the disease being imported from the adjoining county of Berrien. None of the cases were fatal.

Abner B. Fitch, clerk of the board of health of the township of Wales, St. Clair Co., reported 41 cases of scarlet fever, including seven deaths. He states that the first case originated in "the use of clothes that had formerly been infected by a family who had used them and who had the scarlet fever, after which they were boxed up and left in a house until this family moved in, unboxed and used the goods, and thus the disease was cummunicated." At the time of making his report there were 30 cases of scarlet fever prevailing. (March 8, 1879.)

Dr. Joseph H. Cowell, health officer of East Saginaw, reported 235 cases of scarlet fever, 35 in detail, including 3 deaths; he also reported 32 cases of diphtheria, including 12 deaths. He reported 12 of the cases in detail. The source of scarlet fever he is unable to determine; the diphtheria was imported from Saginaw City. He also reported 150 cases of inflammation of throat, and states in a letter, that "a number of cases have been undoubtedly reported as diphtheria, that were not that disease." He reported 25 deaths from typho-malarial fever.

In reply to the demand for an annual report of diseases, a health officer or clerk sometimes writes that he has no report to make because there has been little or no sickness. But it is just as important, in making up a statement for the State, to know in what localities there was no sickness as to know what sickness and how much sickness there was where there was the most sickness. The fact of there having been no sickness, or but little,—and if but little, what that little was—is an important one to be reported. One or two samples of letters from officers who "have no report to make" are here inserted with comments to show that it is important that a report should be made in every case.

NO DISEASES ON THE RECORD, NO DEATHS,—COMMUNICATION FROM SUPERVISOR OF CUSTER TOWNSHIP, ANTRIM COUNTY.

Mancelona, Mich., February 25, 1879.

Secretary State Board of Health:

DEAR SIR:—Your favor is received. I would say in reply, that no diseases appear on the health record for the past year. The health of our people has been remarkably good, no deaths have occurred; hence there is nothing to report.

Yours truly, A. G. JACKSON,
Supervisor Custer Township, Antrim Co.

NO CASE OF SICKNESS DURING THE YEAR,—COMMUNICATION FROM CLERK OF INGALLSTON TOWNSHIP, MENOMINEE CO.

Menominee, Mich., February 11, 1879.

Secretary State Board of Health:

DEAR SIR:—I have no report to make of our health board, for we had not a single case of sickness during the year. We are a very thinly settled township, and a very healthy locality. The name of our health officer is George W. Estover. He is not a physician. His postoffice address is Menominee.

Yours, very respectfully, E. D. HAYNES,
Clerk of Board of Health of Ingallston Township, Menominee Co.

A knowledge of the presence or absence of given conditions in localities where there is but little sickness, or no sickness, or no sickness from a given

disease, constitutes a necessary link in the chain of evidence concerning the causation of a disease. To secure this information is the aim of some of the questions in the blank for the annual report. And it should be remembered by those who fill the blanks, that though there may seem to be but little value in a reply to a question considered in reference to a single locality, the concurrence of a large number of replies, or even the non-concurrence or the dissimilarity of the replies when a larger number are studied together, may establish an important theory or overthrow a false hypothesis. In the following communication from the health officer, facts are given concerning the freedom from sickness reported by the clerk of the board of health of Ingallston township. Such a locality, in which the inhabitants are nearly all in the middle or "prime of life," should be nearly free from disease.

REASONS ASSIGNED FOR HEALTHFULNESS OF THE TOWNSHIP OF INGALLSTON, BY GEO. W. ESTOVER, HEALTH OFFICER.

Menominee, Michigan, Feb. 27, 1879.

Secretary of the State Board of Health:

DEAR SIR:—I send you this day the report from this township. You may think it a little singular that we have had no sickness in our township, but if you will look at the map you will see that we are on the borders of Green Bay. Almost our whole male population follow fishing as a means of livelihood; and besides we have no saloons, no paupers, no lawyers, or doctors; and each and all have plenty of work. I trust our health officer may return the same report for years to come. Hoping this may be deemed satisfactory,

I remain respectfully yours, GEORGE W. ESTOVER,
Health Officer, Township of Ingallston, Menominee Co., Mich.

NO CASE OF DIPHTHERIA, SCARLATINA, TYPHOID FEVER, WHOOPING-COUGH, OR MEASLES—COMMUNICATION FROM D. C. HOLLY, M. D., OF VERNON, MICH.

Vernon, Mich., July 12, 1878.

Secretary State Board of Health:

DEAR DOCTOR:—The public health in this section of the State for the last year has been remarkably good, sporadic intermittents, catarrhs, a few cases of pneumonia have constituted the bulk of the physician's labors in this section of the State. Of diphtheria, scarlatina, typhoid fever, whooping-cough, measles, not a case has been seen in this vicinity. Public hygiene is becoming better understood and practiced. Drive wells are largely taking the place of the old open wells, thus cutting off a fruitful source of sickness and death. Water-courses are being opened, drains constructed, stagnant water got rid of, farms cleared up, and malarial influences largely abated. Respectfully yours, D. C. HOLLY, M. D.

OVER ONE HUNDRED AND EIGHTEEN CASES OF DIPHTHERIA IN CALVIN TOWNSHIP, CASS COUNTY,—REPORTED BY J. H. GREGG, TOWNSHIP CLERK.

Secretary State Board of Health:

DEAR SIR:—* * * * Dr. J. M. Wright, of Brownsville, reports 118 cases of diphtheria in 1878, and six deaths from the same disease. Other cases are known to have been treated, but I do not know how many.

Yours, respectfully, J. H. GREGG,
February 20, 1879. *Town Clerk Calvin Township, Cass Co., Mich.*

ISOLATION IN WHOOPING-COUGH, SICKNESS IN PALMYRA TOWNSHIP IN 1878,—COMMUNICATION FROM J. H. REYNOLDS, M. D., HEALTH OFFICER.

Palmyra, Lenawee Co., Mich., February 8, 1879.

Secretary State Board of Health:

DEAR DOCTOR:—Enclosed please find my annual report for 1878. It will show whooping-cough plenty. It was not until I insisted upon our village not having a Fall term of school that I could isolate the cases; then with eighteen cases in the small village of 250 inhabitants, I so thoroughly isolated that not one other case was exposed. The first case of scarlet fever was brought from Toledo before we knew what it was; the second from Raisin township, where very many were having it;

and one case took it from moving into a house where another family had had it the year before. In all of them the throat symptoms were serious. No sequelae to any of them.

The sanitary condition of the premises of both cases of typhoid fever was bad, but I could find no specific cause; both were in young persons and made good recoveries. Two cases of diphtheria made good recoveries in both cases; the houses were down flat on the ground and floors moist from dirt beneath.

There occurred one death from acute diabetes mellitus, a female, aged 60, married, had been an epileptic from the age of 15 to 49. With cessation of menses the epilepsy disappeared; but she had transmitted "the fits" to son and grand-daughter.

Six of the seventeen persons who died in this township during 1878 had not resided here more than four months; and those six were only traveling for their health or visiting here.

The river Raisin is dammed here in the village and covers and uncovers the bottoms very often. We had more cases of malarial fever last year than any year in the last ten years; and the cases were invariably longer in recovering their strength; but the congestive part of the fever was not so well marked as in the preceding year.

The month of September was by far the sickliest; at one time three per cent of the 1700 inhabitants were having some type of malarial fevers. More of those nearest the river were sick, and less of those farthest away were sick.

Cholera infantum scarcely visited us; in fact I do not believe there was a well-marked case in the township in 1878.

At the date at which I am writing influenza is prevailing and in many instances in children is amounting to broncho-pneumonia.

Yours, very truly, J. H. REYNOLDS, M. D.

In order to put certain facts on record, and to answer questions of interest to local health authorities, the following communications are here printed; they are somewhat disconnected in subject:

SMUT IN CORN, IN 1878,—COMMUNICATION FROM LEE S. COBB, OF NIRVANA.

Nirvana, Mich., January, 1879.

Secretary State Board of Health:

DEAR SIR:—The corn hereabouts was more affected with "smut" last season than I ever saw it,—dent corn was affected more than flint, and the latter more than sweet corn. My dent corn was smutty not only on the tassels and ears, but also on the stalks between the joints. I was very careful to remove all of it, as I have been informed it is injurious to stock. I never saw any bad effects caused by stock eating smut, but I never saw but little of it. Some spring wheat near here was also affected. Rye about as usual—a very little—and I think a very few pieces of winter wheat a very little. LEE S. COBB.

NOTICES OF DISEASES DANGEROUS TO THE PUBLIC HEALTH, DUTIES OF HEALTH OFFICERS,—COMMUNICATION FROM G. W. SPALSBURY, M. D., HEALTH OFFICER OF LEONIDAS TOWNSHIP, ST. JOSEPH CO.

Leonidas, Mich., Jan. 16, 1879.

Secretary State Board of Health:

SIR:—(1.) The law requires that when a physician is called to a case of a disease dangerous to the public health he shall report the same to the board of health or to the health officer. Suppose the attending physician *is* the health officer, should he report to the board of health, or is it sufficient that he make a record of the case to be forwarded with his report to the State Board of Health?

(2.) He is required to report *immediately*, and among other things is to state whether the patient recovered or died. I do not see how these questions are to be answered immediately in cases that often involves sickness of several weeks' duration; for example, small-pox, measles, whooping-cough, etc., and yet I can find nothing in the law which requires a subsequent report.

Very respectfully, G. W. SPALSBURY, M. D.,
Health Officer.

REPLY TO THE FOREGOING INQUIRIES, BY THE SECRETARY OF THE STATE BOARD OF HEALTH.

MICHIGAN STATE BOARD OF HEALTH,
Office of the Secretary, Lansing, Jan. 17, 1879.

G. W. Spalsbury, M. D., Health Officer of Leonidas Township, St. Joseph Co.:

DEAR SIR:—Your communication of January 16, relative to the duties of health officers is received. I reply as follows:—

(1.) In my opinion, one important purpose of the law which requires immediate notice of occurrence of diseases which endanger the public health to be given to the board of health or to the health officer is to enable those charged with the duty of protecting the public health to act promptly for the restriction of the disease reported; therefore, if the health officer is not empowered, by the board of health of which he is an executive officer, to act promptly and vigorously for the restriction of the disease, he should immediately notify the local board of health concerning any case of a disease which endangers the public health, which he is called to visit. Under such circumstances he should also notify the board of health of any case of disease dangerous to the public health which in any way comes to his knowledge. It seems desirable, however, that each local board shall authorize and require its health officer to act promptly, vigorously, and thoroughly for the restriction of any such disease, whenever a case which endangers people within his jurisdiction, shall come to his knowledge.

(2.) The law does not require that the notice shall include statements relative to the termination of the sickness; but the form of notice recommended by the State Board of Health has columns for the entry of such statements, whenever it is possible to do so, as will be the case when the patient dies or recovers before the householder learns that the disease was one dangerous to the public health, or before the physician, called near the termination, has time to make a report; and these additional facts should be given in the first notice, and subsequently whenever it is possible, because they add to the value of the permanent record in the offices of the health officer and clerk of the local board, and also make the report to the State Board of Health more valuable.

I send you two circulars, 25 and 28, issued by this Board, and which seem to bear directly upon this subject. Any aid which this office can render you will be gladly given.

Very respectfully,

HENRY B. BAKER,
Secretary.

DANGEROUS ILLUMINATING OILS.

Because of measures for the public safety which have been adopted in this State, there has been a very great decrease—almost an entire absence—of horrible deaths and mutilations by lamp explosions within the State during the past few years; but inasmuch as there still continues to be a sufficient number of explosions to show that there is yet danger to life in the use of illuminating oil, and especially as it appears that there is some danger in using oil which the State brands as safe oil, the subject still demands attention.

KEROSENE LAMP EXPLOSION WHERE THE FIRE WENT OUT OF ITSELF.—COMMUNICATIONS FROM O. B. CAMPBELL, M. D., OVID.

Ovid, April 16, 1879.

DEAR DOCTOR:—At the time of the explosion the people were not at home. The lamp was nearly full of oil, and turned down. It was broken into several pieces, and fragments of glass and particles of oil were thrown several feet from the table. The spread was burned nearly up and a large hole burned in the carpet, besides soiling the room generally with smoke, etc. I have been able to obtain about an ounce of the same oil which I will send you by express.

Yours, very truly, OLIVER B. CAMPBELL.

Ovid, May 1, 1879.

DEAR DOCTOR:—Your letter of April 21 was duly received stating that the specimen of oil sent you bore a high flash-test. I have again seen the parties where the explosion

occurred, and they say the oil sent you was a true specimen of the kind that exploded. * * * The fire went out of its own accord, probably owing to the fact that the carpet was all wool and the house closed tightly. I will send you the burner of the exploded lamp by mail to-day. * * *.

Yours truly, OLIVER B. CAMPBELL.

The burner was one of the Argand variety, which frequently becomes considerably heated, especially with a charred wick, or when the wick is turned down. The dying out of the fire is quite different from the usual cases of explosion, where oil of low flash-test is used, which fills the whole room with an inflammable vapor.

The following letter shows how a more inflammable oil behaves under similar circumstances; but there seems to be some doubt as to just how inflammable the oil was.

REPORT OF "KEROSENE ACCIDENT" AT FLINT.

Flint, June 14, 1879.

PERRY AVERILL, ESQ.—*Dear Sir:*—Your postal arrived this morning. I went to see Mr. Jas. Hurley, proprietor of Sherman House. Had a conversation with him about the origin of the fire. Facts are thus: Mrs. Hurley had a lamp down stairs on first floor, and carried it up stairs to the oil-room on second floor, which is a small room with window in it. Near this window is a table, on which stand all the lamps used in the house. They usually keep a few lamps burning on this table, for the lodgers to retire with. This window was open, but the curtain was down and flying with the breeze. Now, after Mrs. Hurley had left the lamp on this table she went to the parlor, which is in the front part of the house, on second floor. Had not been gone more than five or ten minutes, when she heard something fall, and then a scream of "Fire!" and soon the whole house was in flames. Now, my theory is, that the wind blew this curtain against the lamp and tipped it off from the table, and the floor being saturated with oil it soon caught.

Mr. Parker brought me some oil the next day, and requested me to test it, which I did. It stood 141° F. He then told me that it was the same oil, or out of the same barrel that Mr. Hurley obtained his oil at Mason & Co's. He said he went to Mason & Co. and asked for the same oil that Mr. Hurley had bought a week before this. These are as near the facts as I can get at. Mason & Co. told me that you had inspected a sample of the oil which I rejected and pronounced it 141 oil. If so I do not think my thermometer is correct, or some "crook" somewhere. After your letter to me about the oil I went to get a second sample of the same oil and it only stood 136° by following your directions to the letter. My father also tested it and found it the same. Whether they sent you the right oil or not I cannot tell. I only want to do my duty correctly as I know how.

Yours, &c., J. L. WILLETT.

P. S.—Mr. Hurley tells me that he has had as many as 12 or 15 chimneys knocked off from the lamps and broken on the floor by this same curtain blowing against them; and that he had cautioned his help about leaving the window up and the curtain down. This is all I can find out at present, but if I get any more facts I will write. Yours, very truly,

J. L. WILLETT.

HEADLIGHT OIL.

During the session of the legislature in 1879 quite a number of petitions were presented asking that the legal test be made the same as "Headlight" oil. With a view of learning whether there was any fixed standard for "Headlight" oil, a letter was addressed to the Standard Oil Co. at Cleveland, Ohio, and from the reply it will be seen that there is no fixed standard. The reply was as follows:

Cleveland, O., Feb. 19, 1879.

Secretary State Board of Health, Lansing, Mich.:

DEAR SIR:—Your esteemed favor of the 17th is received and contents very care-
ed. We never have sold our Headlight oil by flash-test, as it is customary

to get simply the burning-test of these oils; but the writer has talked with our Mr. McGowan to-day, who has charge of all of the testing of all of our oils. He has frequently, for his own information, tried experiments of getting the flash-test of the Headlight oil, and he says that the flash-test shows great irregularity, and a great deal depends upon the nature of the crude oil from which the oil is manufactured, and upon the rapidity with which it is run through our stills. Mr. McGowan says that he has frequently found Headlight oil to flash by the commercial tester at as low as 125°, and with the Michigan tester it will flash at considerably below 120°. In making our Headlight oil we don't pay strict attention to the color.

Yours truly, H. A. HUTCHINS,
For Standard Oil Co.

THE LATE AND THE PRESENT OIL INSPECTION LAW.

Previously to July, 1879, there was no officer charged with, and paid for performing, the duty of general oversight of the State inspection, consequently the law was not perfectly enforced, and in his report to his successor, State Inspector Averill said: "There were several explosions, and two with serious results, all of which occurred in consequence of using oil below the required test."*

On the first of July, 1879, a new law relative to illuminating oil went into effect, since which time there has been a salaried officer charged with the enforcement of the law; but for the first six months under the new law he reported three explosions of lamps, one of a lantern, and says: "Other accidents have occurred when lamps have fallen and been broken, but nothing of this kind of a very serious nature."†

It is worthy of note that under the old law no explosions or "accidents" occurred with legal oil, and under the new law all the explosions and "accidents" occurred with oil that the State brands as safe oil. The evidence seems plain that the inspection is more thorough since the payment of an officer to supervise it, and just as plain that in reducing the flash-test to 120° F. and abolishing the test for paraffine, the inspection, which costs so much, is not as useful as it might be, because it does not secure the only thing the inspection is for, namely, safety in the use of illuminating oil under the ordinary conditions of its use. However, though the law is not yet perfect, there can be no doubt that many lives have been saved in this State in every year since the first inspection of oil within the State; for when this Board began its work the newspapers frequently contained accounts of "horrible accidents" with kerosene, and it is well known that much of the oil used was below the low standard now required.

The difference, if any, in the explosions under the last two laws may perhaps be inferred from the two following statements, the first giving an account of one with illegal oil under the law which did not provide general supervision, the last giving an account of an explosion with oil that was believed to be up to the present low standard. Both these explosions occurred in this State during the year 1879:

Jackson, Michigan, Jan. 23, 1879.

Dr. Henry B. Baker, Secretary State Board of Health, Lansing, Mich.:

DEAR SIR:—In reply to yours of the 18th, calling my attention to the accident happening in the family of J. B. Mosher, of Linden, Mich., the following are the facts as acknowledged by Mr. Mosher: The oil used was illegal low test oil. His boy was playing and turned the lamp over, the oil spreading upon his clothing more or less, taking fire and burning him most shockingly; also

* Page 7, Report of State Inspector of Illuminating Oils, Dec. 31, 1879.
† Page 9, Report of State Inspector of Illuminating Oils, Dec. 31, 1879.

his mother had her hands burned badly in putting it out. Mr. Mosher says he has had a bitter lesson of experience with low grades of oil, and wants no more of it; also, says he was aware he was liable for using it.

Very respectfully,

PERRY AVERILL,
State Inspector Illuminating Oils.

"In November an explosion occurred at the house of J. D. Beach, of Lamont. Inspector Averill looked it up. The explosion was of a hanging lamp. Had been filled and burning for about two hours. So fat as he could learn it was all in good order. The lamp was broken into many pieces. The burning oil was scattered over the floor. Two ladies present with rare presence of mind succeeded in putting out the fire without material damage."—Page 9, Report of State Inspector of Illuminating Oils, Dec. 31, 1879.

In this instance no life was lost, though that appears to have been only accidental, the burning oil striking the floor and not a lady's clothing, as was so common when explosions were common.

The present law of this State regulating the inspection, sale, and use of illuminating oils, does not seem to be effective in preventing the use of all dangerous oils and fluids as illuminators. In reply to a correspondent, the Detroit Post and Tribune said in its columns:

"The law prohibits the *sale* of burning fluids and patent compounds for illuminating compounds, but it does not prohibit their *use*."

In reply to a letter of inquiry from this office relative to the interpretation of the law, one of the editors wrote as follows:—

"We do not understand the aforesaid 'burning fluids' and 'patent compounds' to which we had reference, to be 'adulterations of oil,' but on the contrary to be skillfully concocted to completely evade the law, a thing which we are advised by the oil inspector of this district is done every day."

A copy of the present oil law will be found on pages 14a–14d of this Report. It is printed as an appendix to the "Historical Review of Legislation relating to the Inspection of Illuminating Oil in Michigan," by Professor Kedzie, President of this State Board of Health. In Professor Kedzie's paper the reader will find a brief and clear history of the subject, including the best and prominent features of the present law. His address was written early in the year, before it was possible to know by experience the explosions and difficulties of burning the oil used under the present law; though from his knowledge of the subject, he was able to predict what the State Inspector of Oils afterwards reported on both these points, reference to one of which is included in the foregoing comments. This part of the Report being the last printed, it is thus possible to include in the same volume with his address a reference to an official verification of his predictions.

This Seventh Annual Report is respectfully submitted.

HENRY B. BAKER,
Secretary.

A HISTORICAL REVIEW OF LEGISLATION

RELATING TO THE

INSPECTION OF ILLUMINATING OIL IN MICHIGAN.

THE ANNUAL ADDRESS FOR 1879,

TO THE

STATE BOARD OF HEALTH OF MICHIGAN,

By ROBERT C. KEDZIE, M. D.,

PRESIDENT OF THE BOARD.

A HISTORICAL REVIEW

OF LEGISLATION RELATING TO THE INSPECTION OF ILLUMINATING OIL IN MICHIGAN.

The inspection of illuminating oil has been a subject of legislation at every biennial session of our legislature for ten years past, and it is possible that we have not reached the end of legislative changes on this subject. Since kerosene is a material in almost universal use as an illuminator in our State, and the quality of the oil is intimately associated with the public safety, and because the action of the State Board of Health in relation to this subject has been severely criticised, I have thought it might be proper to review the history of legislation on this subject, and to mark the several steps by which we have reached the present law.

I do not recall the history of this sanitary law for the sake of airing any views and notions I may have on this subject. It is a matter of small consequence what I may think or say. The great mass of our people will tranquilly go about their daily toil regardless of what may be the views and convictions of any individual in our State. Not so with the notions and ideas of our legislators *when they have become crystallized into law.* The hand of law with its viewless fingers touches every individual in our State, and, banning or blessing, penetrates every home in our commonwealth. There is no home so lowly and obscure that is not pervaded by its unseen influence. An opinion may become obsolete and be discarded; but a law is clothed with perpetual power and loses none of its vitality with the lapse of years, unless it is changed or repealed by the same power that made it. The laws of a people therefore are more important than their customs and usages; these may daily change and fluctuate with surrounding circumstances and conditions; but law is inexorable in its nature till the abrogating hand of legislative power shall tear it from the statute book.

Some laws, while general in their terms, are applicable only to a small portion of our inhabitants; some are aimed entirely at the criminal classes; some are for the restraint and guidance of certain classes only who are engaged in special callings, or they come into requisition only at distant intervals; but this law, which concerns the quality of a material in daily use in nineteen-twentieths of the homes of our State, becomes a matter of vital importance to a larger number of our citizens than almost any law on our statute books. It daily reaches and touches *the common masses*—everybody in fact except the rich few in our cities. The importance of this law becomes my vindication for tracing its history.

LAW OF 1869.

Act No. 128 of session laws of 1869 is the first enactment on our statute books on the subject of "inspection of illuminating oils manufactured from petroleum or coal oils." This act provided that "upon the application of five or more citizens of any county within this State, wherein any illuminating oils are manufactured and refined from petroleum or coal oils for the purpose of burning the same in any kind of lamp, as an illuminator, or where the same, or a mixture of petroleum and coal oil is sold for that purpose, the judge of the circuit court within whose judicial district the said county is embraced, shall appoint a suitable person who is not interested in manufacturing, dealing, or vending any or either of said oils, whose duty it shall be to examine and test the quality of all petroleum or coal oils that he shall be requested to examine and test by any manufacturer, refiner, vender, or dealer," etc. The inspector, before entering upon the duties of his office, must take an oath or affirmation to discharge the duties of inspector faithfully, and give a bond. He is required to "reject as dangerous all petroleum or coal oils, which, at the temperature of one hundred and ten degrees, Fahrenheit's thermometer, will emit an explosive gas, or take fire on applying thereto or plunging therein a well-lighted match." Fees for inspection, "ten cents for each and every package, cask, or barrel inspected and branded by him."

The terms employed in this act to describe the source of the illuminating oil, are "petroleum or coal oils." This act was passed nearly nine years after the manufacture of illuminating oils from mineral coal had been abandoned in this country, because the abundant petroleum of Pennsylvania had driven coal oil out of the market. Coal oil is still manufactured in Germany, and in Great Britain to some extent, but its manufacture in the United States has become a thing of the past although the name is still retained.

LAW OF 1871.

In 1871 the law was amended in three particulars, but the flash and burning test of 110° F. was still retained: 1. The governor and not the circuit judge had the power of appointing county inspectors upon the petition of five or more persons, residents of said county; 2. The fee for inspection was reduced from *ten* cents for each package, barrel, or cask to *four* cents for the same; 3. A new section to stand as section 8 was added: "It shall not be necessary for any person to have inspected, under the provisions of this act, oils brought into this State from any other of the United States, which have been inspected under the laws of any other such State, if the package, cask, or barrel in which the same is brought into this State shall bear a brand or device of the State inspector or deputy State inspector of such other State, showing that the contents thereof have been approved and stand a fire test of one hundred and ten degrees of Fahrenheit's thermometer." By reducing the fee of inspecting and branding to four cents a barrel, and by accepting the inspection and branding of an inspector in another State as sufficient, the legislature seemed desirous of transferring the inspection of illuminating oils to other States and of discouraging inspection in our own State.

LAW OF 1873.

The law was again amended in 1873, by restoring the fee for inspection to ten cents, and by raising the test to 150° F. by requiring the inspector "to report as dangerous all oils which at the temperature of one hundred and fifty

degrees of Fahrenheit's thermometer will emit an explosive gas or take fire on applying thereto or plunging therein a well-lighted match."

This is the beginning of high-test legislation in regard to the inspection of illuminating oils. Much has been said in praise of this high test, and much more in bitter denunciation of the test and of those who were supposed to have been instrumental in securing its enactment. I do not propose at this time to express any opinion in regard to the value of this high test, but simply wish to call attention to the fact that neither the State Board of Health nor any member of it is entitled to either praise or blame on this score, because they had nothing to do directly or indirectly with its enactment. The State Board of Health had no legal existence at the time this law was passed, because the act creating the State Board of Health did not take effect until more than three months after this amendment establishing the high test was passed. Nor did any person who afterward was appointed a member of the State Board of Health have any part or use any influence in securing this high test. Ninety days after the final adjournment of the Legislature of 1873, Act No. 81 creating the State Board of Health took effect. When the Board organized, they found Act No. 103 had also become a law and was one of the laws relating to public health which must guide the action of the Board in relation to the inspection of illuminating oils.

One of the reasons which strongly influenced the Legislature of 1873 in adopting this high test was the large number of accidents caused by using low-grade kerosene, by which a large amount of property was destroyed and many lives lost. So dangerously inflammable were the oils in use that many persons of large information and unusual intelligence regarded kerosene as belonging to the same class as gunpowder, so far as safety is concerned. Some even expressed a doubt "whether the stuff could be made safe for common use." But if person and property could be made safe they were willing to adopt any test which would secure this end.

While the law was amended in regard to the test, and the fee for inspection was restored to ten cents, yet section 8 of Act No. 45 of the session of 1871, which accepted inspection made in another State by any State inspector or his deputy and reïnspection in this State was not required, was left in full force. Our people were thus left to the tender mercies of the Cleveland inspectors for the next two years. The quality of the oil was the same as before the high test was adopted, and the same conditions of danger and terror threatened our people. Our law had changed the test from 110° F. to 150° F. and the brand of the Cleveland inspectors was correspondingly changed, but in every other respect the conditions were unchanged.

In 1867 Ohio passed a law which carefully guarded and regulated the inspection of illuminating oils: the inspector was appointed by the judge of the court of common pleas; the inspector must take an oath to perform the duties of his office with fidelity, and must file a bond with surety, which bond shall be for the use of all persons aggrieved by the acts or neglects of such inspector; if such inspector, or manufacturer, or vender shall falsely brand any cask, etc., he shall be fined in a heavy sum, or sent to jail, be liable for loss of property destroyed in consequence of use of oil falsely branded; and if there is loss of life the parties shall be deemed guilty of manslaughter, and punished accordingly. It was while this law was in force in Ohio that the celebrated 8th section was added to our law in 1871, by which we accepted inspection made outside our State and abandoned the policy of reïnspection within our State. But in less than thirteen months after this 8th section was enacted, the Ohio

law was repealed, and another law was passed which wiped out the stringent provisions of the former law against fraudulent inspection and false branding of illuminating oils, and permitted the dealer or manufacturer to test his own oils or to employ some one to test them for him. We were thus presented with the astonishing spectacle of a manufacturer legally authorized to inspect his own work and pronounce the final verdict upon its quality. The parties who were entrusted with the vast responsibility, so far as public safety was concerned, of inspecting so variable a substance as petroleum oil, were not required to take an oath; they gave no bond, and were under no penalty for dishonest inspection or false branding; they were not appointed by judge, governor, or other responsible official, but were mere hirelings whose greatest misfortune would be to lose the favor and patronage of the parties whose oils they were hired to inspect. To these utterly irresponsible persons we had entrusted the inspection of our illuminating oils and the carrying out of the law requiring a test of 150° F. Under such circumstances the only change effected by our high-test law of 1873 was a change in the stencil plates of the Ohio inspectors!

Such was the condition of affairs respecting the inspection of illuminating oils when the State Board of Health was organized in July, 1873. The law had committed to this Board "the general supervision of the interests of the health and life of the citizens of this State." At the first meeting of the Board, Dr. Hitchcock, in his introductory address, used the following words: "Here then is the work for this Board to do: *to educate the people in respect to the nature and causation of diseases, and the means for their prevention;* to suggest appropriate legislation for compelling, when necessary, the use of those means, and to present arguments for such education and legislation, fortified and made cogent by *facts,—well authenticated* cases of disease and death directly traceable to ignorance, neglect or disobedience of the laws of hygiene; and to make it possible by this work that many if not all of the lives and much of the treasure now needlessly lost to the State, may be saved."

Of the many preventable causes of death (and every preventable death which is not prevented partakes of the nature of crime) which then confronted us in this State, none were more efficient than the use of dangerous kerosene. "Well authenticated cases of death" from this cause were only too numerous, for one could scarcely open a newspaper without finding accounts of some "kerosene horror." In mapping out the work of the Board among the several members, the chairmanship of Committee 7, "Poisons, Explosives, Chemicals, Accidents, and Special Sources of Danger to Life and Health," was assigned to me. It was not a position which I sought, but my colleagues considered that my professional training and position would especially qualify me for this kind of investigation. My appointment also as a member of the Board itself came to me unsought; but when big-hearted Gov. Bagley assigned me this position of hard work and great responsibility, I accepted the position. It thus appears that the influences which set me to work in this field of investigation were not of my seeking, but I entered a path toward which duty seemed to point with changeless finger.

In entering upon the work assigned to the State Board of Health, my first investigation, and the first article published in the First Annual Report of the Secretary of the State Board of Health, was on "Illuminating Oils in use in Michigan," in which I attempted to show the dangerous quality of most of the oils in use, the unreliability of Ohio inspection, and to point out a method of inspection by which reliable results could be secured. In carrying

out these investigations I found that some apparatus for inspection which would give unvarying results and which should not be so largely under the personal control of the operator as the Tagliabue cup, was a necessity. After much experimenting I finally devised a close-chamber tester which was very simple in its structure, was inexpensive, could be used by any person of good judgment and observation, and yet would yield closely concordant results in the hands of different operators. This tester I dedicated to the State Board of Health, who adopted and recommended it, and named it the "State Board of Health Oil-Tester." This was subsequently adopted by the Legislature, and is still the legal oil-tester in this State. It has also been made the legal oil-tester in some other States.

LAW OF 1875.

When the legislature of 1875 convened, the oil trade in our State was in a demoralized condition. While the honest and honorable oil dealers were everywhere anxious to comply with the law and to sell a safe oil, they were confronted by a class of 'scalpers' who, by selling an oil far below our legal standard, yet bearing the brand of the Cleveland inspector, could undersell the honest dealers and drive them out of the market.

Under such circumstances, representatives of the class of dealers who wished to do a straightforward business in illuminating oils, asked me to assist them in devising such changes in the law as would compel an honorable condition in the oil-trade, and to urge upon the legislature the adoption of these changes. The amendments recommended, and adopted by the legislature were the following:

1. The appointment of a State Inspector of oils, in place of county inspectors.
2. Rejection of out-of-State inspection, and requiring inspection in all instances by our State Inspector or his deputy.
3. The adoption of the State Board of Health oil-tester.
4. Permitting the use of gasoline for illuminating purposes when the reservoir is under ground and outside the building to be lighted by it.
5. The burning-test of 150° F. was retained in this law, but the flash-test was reduced to 140° F. It will thus be seen that the only connection I have had with the high test was to secure a reduction of ten degrees in the test.

The results of the legislation of 1875 in regard to the inspection of illuminating oils were most marked. For the first time we had efficient and general inspection of illuminating oils, and people began to secure immunity from kerosene accidents, and felt safe in the use of this material. Unfortunately the refiners found they could make a large profit in making Michigan oil by running in a large amount of paraffine oil, which is a cheap and comparatively worthless product in distilling petroleum. The poor quality of the oil became very evident in cold weather, when much of the kerosene would freeze solid in the lamps, and the illuminating quality of the oil was very much reduced by this adulteration with paraffine oil. The people justly complained of the quality of the oil, and the refiners, whose largest profit lies in making the low-grade oils, persuaded the people that the poor quality of the oil was a necessary consequence of the high test.

LAW OF 1877.

In consequence of the poor burning quality of the oil, a strong effort was made in 1877 to reduce the test, on the supposition that in this way only could the people obtain an oil that would not freeze up and would give a good light.

As the result of careful experiments, I was satisfied that the poor quality of the oil was not due to the high test, but was caused mainly by the large amount of paraffine oil which it contained; that we might have a poor quality of oil with a lower test if paraffine was not excluded, and that if the paraffine and waxy products of distillation were excluded, we might have a good illuminator which would still bear the test of 140°. Accordingly I made a careful study to find some simple test by which any injurious amount of paraffine could be detected in illuminating oils. I first directed my attention to the specific gravity of oil containing paraffine in comparison with oil of similar quality free from paraffine, in hopes that the hydrometer might give us a ready and efficient means of detecting an injurious amount of paraffine; but the specific gravity of paraffine differs so little from that of high-grade kerosene, and the density of all these oils varies so largely with variations of temperature, that a careful examination of this mode of testing soon satisfied me that specific gravity was not a sufficiently sensitive test for an injurious quantity of paraffine in illuminating oils. After many trials I found that *cold* was the most sensitive of the easily applied tests, and I finally settled upon the test by chilling the oil to 20° F. for ten minutes; if it remained transparent and colorless at the end of ten minutes, there was not present a sufficient amount of paraffine to injure the burning quality of the oil. This chill test was very simple and easily applied, but it was one which the manufacturers could not get around: it was a complete bar to adulteration with the cheap and comparatively worthless paraffine oils.

The most noticeable changes in the law of 1877 are,—

1. Adoption of the chill test.
2. The Inspector required to make an annual report to the Governor.
3. The use of uninspected oil made a misdemeanor.
4. The selling of kerosene barrels without canceling the inspection brand, made a misdemeanor.
5. The use of naphtha in street lamps permitted.

Ever since the law of 1875 went into effect by which we secured uniform inspection within our State and by our own State Inspector and his deputies, the people, both in their persons and property, have been almost entirely exempt from injury by kerosene. Before that time, our people were in constant terror on account of this dangerous substance; but since this law went into effect scarcely a life has been lost by the use of kerosene, and when such an event has occurred, almost always it has been found that the oil was not up to the requirements of our law. Four years of exemption from such dreadful accidents on the part of the people of our whole State, is a pleasant thing to remember. If some members of the Board of Health have been bitterly denounced because of legislation on this subject, it is some compensation to think that there are scores of men, women, and children now in life and safety, who, but for the merciful provisions of this law, would have gone down to their graves through a death of unspeakable agony!

Of the good secured by this law I do not wish to bring forward my own statements, but to bring forward the testimony of disinterested but observant witnesses. State Inspector Averill, in his annual report to Governor Croswell for the year 1878, says: "There could be found, perhaps, no better evidence of the wisdom of this law than the comparative immunity it has afforded from accidents and the consequent loss of life and destruction of property. During the past year there has been but one human life lost by the explosion of illuminating oil, and that has occurred in consequence of using oil below the test

required by the statute. The case was that of a lady residing in the township of Bedford, Monroe Co., and occurred on the 3d of February, 1878, from the explosion of a kerosene lamp. She was using oil purchased in Ohio, and which was below the Michigan standard."

I also introduce the following letter from a prominent oil dealer in Detroit, who has not only been many years in the trade but has had practical experience in refining oils, and is thoroughly familiar with the oil business in all its phases:

DETROIT, *January 13, 1879.*

Prof. R. C. Kedzie:

MY DEAR SIR:—What are your views concerning a change in the present carbon oil law? There seems to be quite a pressure in some parts of the State to have the test lowered to 120° flash. As a dealer, I have no feeling in the matter, but I know we have the best and safest law in the Union, and it would seem rather foolish to make a change now. Since the present law took effect we have had a good oil to burn, besides I have been unable to trace a single accident to inspected oil. I also believe that the present test has saved at least a quarter of a million dollars in property since Aug. 23, 1877,—the date the law took effect. * * * * * *

Respectfully yours,

M. V. BENTLEY.

The following letter was received by Dr. Baker, Secretary of the State Board of Health, in reply to an inquiry addressed to Fred. H. Seymour, Secretary of the Fire Commission of Detroit:

DETROIT, *May 21, 1879.*

Dr. Henry B. Baker, Secretary, etc.:

DEAR SIR:—Your esteemed favor came duly to hand, and in answer to your enquiry regarding lamp explosions, would respectfully state that, out of 777 causes of fire reported, 41 are classified as occasioned by *lamp* or *gas* explosions.

It can be safely stated that this State will show a remarkable freedom from lamp explosions, due wholly to the sensible and secure high-test oil which the law requires, and any cause of fire classed as lamp explosion, could not come properly from pure oil of 150° test. The trouble is, that in the larger cities unscrupulous retailers adulterate the oil with naphtha, benzine, and the like dangerous substances. To reach this difficulty local ordinances are necessary; but are difficult to secure from boards of aldermen and common councils, as the men composing such bodies are either apt to be retailers themselves, or under the control of corner grocers, who are generally politicians, and in consequence are down on any legislation that points the finger at them.

I have in my office a sample of oil sold in this city about four years ago, which was the occasion of an explosion and loss of life. This substance, sold as kerosene, will flash at 90°, and is nothing but a compound of naphtha and kerosene.

Out of 234 fires in 1878 in Detroit, 41 are classed as incendiary. Kerosene is almost invariably used by the incendiary, and, if nothing else can be claimed for high-test oil, it certainly does often disappoint the criminal. Time after time the fire department has extinguished fires of this kind before the kerosene-soaked rags and sticks had burned, and the whole *animus* of the attempt stood revealed. Had the oil been other than "Michigan test" the building would have been far toward destruction.

Many fires are reported as occasioned by lamp explosions that are really from other carelessness, such as breakage, overturning, dropping, etc., and should not be considered as explosions. Statistics as to the cause of fires are not kept in other States, and there is nothing with which the record of this State can be compared. If such comparison could be obtained, I am convinced the immunity from horrible accidents and destruction of property secured to Michigan by the use of high-test oil would be so apparent as to be startling when compared with any other State without such sanitary law.

Very respectfully,

FRED. H. SEYMOUR,
Secretary Fire Commission.

The attempts at arson by use of kerosene, but which have failed because the kerosene was too incombustible, have been made in many places in the State. Such cases have occurred in Lansing; in one, the loss would probably have reached $100,000 if the kerosene had been more inflammable. Judging from the tone of the discussion on the oil question last winter, many persons will feel no surprise that the kerosene went out of itself! But I need not bring forward proof that our kerosene was safe; most of our people seem to have forgotten that it was ever dangerous. Formerly the demand was for safe kerosene, but of late the cry has gone up for cheap oil.

CHANGES MADE IN THE LAW IN 1879.

When the legislature convened last winter, this demand for cheap oil found expression in a large number of petitions which poured in from every quarter, asking for a reduction of the test to that of "head-light oil,"—to 120°,—to 110°, etc., etc. Many of these petitioners seemed to be ignorant of the fact that "head-light oil" did not express any fixed and definite quality of oil so far as the flash-test is concerned, but is only a popular name for an oil of very varying quality.

The most noticeable changes made in the law by the legislature in 1879, are the following:

1. Making it lawful for an inspector to enter upon the premises of any dealer, and if he finds any uninspected oil, to inspect and brand the same. This is a very commendable change.

2. The flash-test is reduced to 120° F. for all petroleum oils used for illuminators; but the "machines or generators constructed on the principle of the 'Davy Safety Lamp,'" are exempted from the provisions of this act. The results of this change are yet to be seen.

3. The chill-test is abolished, and manufacturers may add all the paraffine oil they choose. When cold weather comes and the lamps freeze up, the people will have an opportunity to pass upon the value of this change.

4. The Inspector to receive a salary of $1500 a year and his traveling expenses; each deputy inspector to receive a salary according to the quantity of oil he inspects each month, but not to exceed $100 a month and traveling expenses.

5. The cost of inspection largely increased.

I do not propose to take up and pass in review the many arguments which were brought forward in the legislature and by the public press in favor of these changes, as my main purpose is to give a historical review of legislation upon the subject of illuminating oils. But there was one argument brought before the legislature which, both on account of the influence which it exerted, and the dangerous conclusions that may be drawn from it, demands some consideration in this connection. I refer to Prof. Langley's "Margin of Safety."

Prof. J. W. Langley, of Michigan University, by invitation of the House of Representatives, gave a lecture on illuminating oils in Representative Hall last February, which was listened to with marked attention. During his lecture he exhibited a number of lamps burning; in the vapor-chamber of each lamp, or that space within the lamp not filled with oil, was inserted the bulb of a thermometer, and the temperature of the vapor-chambers, as indicated by these thermometers, was marked upon a blackboard from time to time, so that the audience could watch the progress of the experiment. One lamp was purposely left to burn without any chimney in order to secure a condition supposed

to be especially dangerous on account of the tendency to heat the lamp. The temperature in the vapor-chamber of this lamp rose to 99° F., while no other lamp exhibited so high a temperature in the vapor-chamber.

After calling attention to the tables on the blackboard giving the results indicated by the thermometers, he stated that the temperature in the vapor-chamber was the measure of danger in the use of any oil,—that the difference between the temperature of the vapor-chamber in any lamp and the flash-test of the oil used in that lamp was the margin of safety,—that the difference between the highest temperature reached in a lamp burning under the most dangerous natural conditions, and the flash-test of our oil gave 41° as the margin of safety in our State (*i. e.* the difference between 140° and 99°=41°),—and that this margin of safety was enormous, being the difference between the temperature of a block of ice and that of a hot summer day!

Prof. Langley thus assumed that the vapor in the air-chamber of a lighted kerosene lamp, in order to form an explosive mixture, must have a temperature higher than (or as high as) the flashing point of the same kerosene, as determined in the usual method of inspecting oil in this State. This proposition might hold good if our oil was inspected by determining the *temperature of the vapor-chamber in our oil-tester*, instead of the *temperature of the oil* which gives off the vapor. If the temperature of the vapor space in the lamp and the temperature of the oil in the same lamp are always identical, we might have a logical basis for such reasoning; but if it is otherwise, and if there is a marked difference at certain times in these temperatures, we may find this so-called "margin of safety" a vanishing quantity. When we consider that the wick-tube, with which the oil comes constantly in contact, becomes much heated when the lamp is burning, we find reason to doubt the assumption that the temperature of the vapor-chamber gives the limit of danger, or that the difference between the temperature of such a vapor-chamber and the flash-test of that oil, as determined in the usual method of inspecting oils, affords the actual margin of safety.

The tendency of the wick-tube to become dangerously hot in many cases, was demonstrated experimentally by Dr. Baker in 1877, and the liability to lamp-explosions from this cause was clearly pointed out at the same time. Dr. Baker's report on this subject may be found in his Annual Report of the State Board of Health for 1877, pp. lxxv.–lxxviii.

After Prof. Langley's lecture, Dr. Baker made a new set of experiments with the oil-tester to see what was the temperature of the vapor-chamber as compared with the oil, and found that the difference in temperature between the oil and the vapor-chamber when the flash point was reached was 20° to 21°, so that one-half of this "enormous margin of safety" was wiped out at once, because just before the flashing point was reached the temperature of the vapor-chamber was 119° in one case and 120° in the other, while the temperature of the oil was 140°.

Dr. Baker wrote to Prof. Langley, giving the results of his experiments, asking him to make a correction of his former statements made before the legislature, in accordance with the facts thus presented. Prof. Langley demurred, pleading that in his experiments Dr. Baker had heated the oil *from below*, and thus did not fulfill the conditions found in a burning lamp, and that the flame from the ignited splinter used in testing might have heated the surface of the oil and the vapor in its vicinity, and thus produce a flash at a temperature which appears to be below the proper flashing point. He appears

to place more reliance upon certain scientific statements about the vapor tension than upon the results of direct experiments with lamps and oil.

Dr. Baker subsequently made experiments, heating the oil from above by removing the chimney from a lamp while burning, and with results of similar import; namely, that when the explosion occurred the temperature of the vapor-chamber was much below the "flashing point" of the oil, found in the usual manner.

Failing to get the desired correction, Dr. Baker presented the following memorial to the legislature:

To the Honorable, the Senate and House of Representatives of the State of Michigan:

Your memorialist respectfully represents that he has made experiments with illuminating oils which disprove the conclusion reached by Prof. Langley, and stated recently in a lecture in the hall of the House of Representatives, which conclusion was to the effect that because the vapor-chambers in lamps in ordinary use are not of a higher temperature than 99°, there is, therefore, a margin of safety of 41° when using the Michigan-test oil of 140°, flash test; your memorialist therefore here asserts that such a conclusion is not in accordance with the facts; that, as near as his present experiments show, it is wrong by at least 20°; and, as the interests of public safety, of life as well as property, are involved in the questions of fact as to the temperatures in the vapor-chambers of lamps in ordinary use, and the relation of such temperatures to the tests established by law, he therefore respectfully petitions your honorable body to take some action which will lead to the determination of these important points before you reduce the present tests, which are believed to secure reasonable safety to the lives and property of those who use illuminating oils; and your memorialist respectfully represents that if the tests be reduced without such knowledge as is here asked for, it will be an experiment upon the success or failure of which the lives of some of those who use illuminating oil depend, as will also depend, to a considerable extent, the saving or destruction of property exposed to danger of loss by fire.

In the interest of life as well as of property, your memorialist earnestly prays your honorable body to retain the present useful tests of illuminating oils until such time as you shall learn more accurately than has been shown before you the margin of safety in the use of illuminating oils in ordinary lamps. Believing, however, that the flash test may safely be so far modified as to indicate the temperature of the vapor-chamber in the oil tester, your memorialist respectfully suggests that your committee on public health be requested to ascertain whether or not it is practicable to so modify the flash test as that the thermometer shall show the temperature of 120° F. in the vapor-chamber of the oil-tester and not of the oil or of the metallic portion of the tester, which has no relation to the vapor-chamber in a lamp, though it has an important relation to the heated wick-tube in a lamp, with which the oil in the wick is constantly in contact.

That your action, if any, be based upon knowledge of the important facts involved, and will efficiently guard the interests of life in the use of illuminating oil, your memorialist earnestly prays.

HENRY B. BAKER.

As this subject is one of more than merely scientific interest, but may involve public safety and human life, I have devoted some attention to the relations of temperature of the vapor-chamber to that of the oil. In order to obviate the objection to a blazing stick introduced into the vapor-chamber, and its possible disturbance of temperature in surrounding bodies, I discarded the flame entirely and used the electric spark instead. I have tried specimens of oil of different qualities in the Michigan tester, having one thermometer in the oil and another in the vapor-chamber. The oil was heated in the usual way, and the spark passed through the vapors until the flash was reached, the temperature as indicated by the thermometers being carefully read off before the spark was passed. In all instances the thermometer in the vapor-chamber indicated a lower temperature before the flash than the one in the oil. The difference in temperature was not uniform for all the oils; in one instance I

found the difference as small as 12°, and in another as great as 24°, but the most usual difference was 20°.

To many persons this discussion will be of scientific interest only, *i. e.*, of no interest at all to them. They will say, "We care nothing about your vapor-chambers and electric sparks; what we want is an answer to this practical question: Is a lamp burning Michigan-test oil liable to explode?"

To answer this question, I filled four flat-fount lamps with Michigan-test oil, lighted them and left them burning in the usual way (with their chimneys on), for two hours in a basement room whose temperature was 75°. I then passed the electric spark through the vapor-chamber when one exploded with some violence, the flame spreading rapidly through the whole vapor space with a bright flash; the residual air was then pumped out and the lamp again exploded three times in succession. Another lamp exploded feebly, filling the vapor-chamber with white smoke, and this explosion was repeated. The two remaining lamps did not explode.

A lighted lamp containing Michigan-test oil was placed ten minutes in direct sunlight in a window in the basement; it was then removed and the spark passed through the air in the vapor-chamber, which exploded. This air was pumped out, the lamp gently shaken, and the electric spark again passed, when it again exploded; and this experiment was repeated till we had exploded the contents of the vapor-chamber seventy times. At the end of the experiment the temperature of the oil in the lamp was found to be 109° F.

A lighted lamp with the same kind of oil was placed for fifteen minutes in the sunlight on the window sill; the lamp was then removed and the temperature of the vapor-chamber measured, when it was found to be 99° F.; an electric spark was then passed through the vapor-chamber when a somewhat violent explosion occurred which extinguished the lamp and threw out the cork sustaining the insulated wire which served to convey the electric current.

A similar set of experiments were performed a few days after in the presence of Dr. Baker, and with similar results.

In view of these experiments, some one may ask, has the Michigan legislature wiped out the whole of Prof. Langley's "margin of safety"?

INSPECTOR'S FEES.

The several legislatures have fixed the fees for inspection of illuminating oils, each legislature appearing to attach a different value to this service. As it was a matter which did not directly affect the public health, the Board of Health has never attempted to use any influence on this subject. The fees have varied much, but since 1871 there has been a continual increase in the fees. For the purpose of comparing the inspection fees established by five consecutive legislatures, I will take the fees allowed to an inspector for the first forty barrels he inspects, in each of the years named:

In 1871 the fees for inspecting 40 barrels were	$2.40
1873 " " " " "	4.00
1875 " " " " "	6.80
1877 " " " " "	8.00
1879 " " " " "	28.50

The law of 1879 is peculiar in this respect, that the deputy inspector can only receive such large fees for the first forty barrels he inspects *in each month*, the fees continuing to decrease to such an extent that he only received $42.50 for the first hundred barrels he inspects in each month; the second hundred

barrels would only bring him $8.00; the third hundred barrels, $6.00, etc. If a deputy inspector is in some small district he may not have more than a couple of car loads of 50 barrels each to inspect in each month of the year. The inspection of 50 barrels of oil, if carefully made, ought to consume a whole day, and two days' work would be necessary to bring him $42.50 each month, or a little more than $500 a year besides his traveling expenses. The monthly wages of a deputy inspector, however, cannot exceed $100 and traveling expenses for any one month in the year. The salaries of the inspector and his deputies are paid by the consumer in the form of the uniform tax levied on all the oil inspected, so that these salaries and traveling expenses can never become a direct tax on the State.

But whatever may be said about the fees for inspection which the legislature has established, no one will suppose that the State inspector had any connection with the change, because he was appointed long after the change was made. The people are to be congratulated that if any change was to be made in the office, so incorruptible a man as Cyrus G. Luce has been appointed; and may rest assured that under him, as under his immediate predecessor, the inspection of illuminating oils will be made with fidelity.

GOOD RESULTS REACHED AND RETAINED IN OUR LAW.

While the changes in our law by the six legislatures, from 1869 to 1879, have been numerous and fluctuating, yet substantial progress has been made in the legal provisions for inspecting illuminating oils. I will close this paper by stating the most pronounced of these improvements still retained in our laws:

1. Discarding the inspection made by irresponsible parties outside our State, and requiring inspection within our State in all instances by officers under our law, who, by oath and bond, have given pledges of fidelity in their official positions.

2. Uniform inspection throughout the State by a State inspector and his deputies, in place of the loose and conflicting county system.

3. An accurate and unvarying mode of inspection by the State Board of Health oil-tester, instead of the so-called commercial method, or open cup.

4. Requiring the cancelling of the inspector's brand on any kerosene barrel before it can be sold, so that the same inspection brand shall not serve to pass an indefinite number of barrels of oil never inspected by our officers.

To secure these four changes in our law, which are still retained, and which in all human probability will never be stricken from our laws, the influence of the State Board of Health has been directly exerted. If progress has been fluctuating, like the waves of an incoming tide, which appear to rise only to fall again, yet like that tide, the fluctuations have on the whole carried us to a higher level. When we compare our present law with that of 1869, no one can doubt but that real progress has been made in a matter intimately associated with a subject of overshadowing interest—THE PUBLIC HEALTH.

APPENDIX TO THE ANNUAL ADDRESS OF THE PRESIDENT OF THE MICHIGAN STATE BOARD OF HEALTH, FOR THE YEAR 1879.

[Act No. 127, Laws of 1879.]

AN ACT to provide for the inspection of illuminating oils manufactured from petroleum or coal oils, and to repeal act number one hundred and eighty-one of the session laws of one thousand eight hundred and seventy-five, approved May first, one thousand eight hundred and seventy-five, and act number one hundred and ninety-six of the session laws of one thousand eight hundred and seventy-seven, approved May twenty-second, one thousand eight hundred and seventy-seven.

SECTION 1. *The People of the State of Michigan enact,* That the governor shall appoint a suitable person, resident of the state, who is not interested in manufacturing, dealing in, or vending any illuminating oils manufactured from petroleum, as state inspector of oils, whose term of office shall be two years from [the] date of appointment, or until his successor shall be appointed and shall qualify. It shall be the duty of said state inspector, or his deputies hereinafter provided, to examine and test the quality of all such oils offered for sale by any manufacturer, vendor, or dealer, and if, upon such testing or examination, the oils shall meet the requirement hereinafter specified, he shall fix his brand or device, viz.: "approved," with the date over his official signature, upon the package, barrel, or cask, containing the same. And to more effectually carry out the provisions of this act, it shall be lawful for the state inspector, or his deputies, to enter into or upon the premises of any manufacturer, vendor, or dealer of said oils, and if they shall find or discover any kerosene oil, or any other product of petroleum that has not been inspected and branded, according to the provisions of this act, they shall proceed to inspect and brand the same. And it shall be lawful for any manufacturer, vendor, or dealer to sell the oil so tested and approved as an illuminator; but if the oil or other product of petroleum so tested shall not meet said requirements, he shall mark in plain letters on said package, barrel, or cask, over his official signature, the words: "Rejected for illuminating purposes;" and it shall be unlawful for the owner thereof to sell such oil, or other product of petroleum, for illuminating purposes; and if any person shall sell or offer for sale such rejected oil, or other product of petroleum, for such purpose, he shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be subject to a penalty, in the discretion of the court, in any sum not exceeding three hundred dollars.

SEC. 2. The state inspector provided for in this act is hereby empowered to appoint a suitable number of deputies, which deputies are hereby empowered to perform the duties of inspection, and shall be liable to the same penalties as the state inspector: *Provided,* That the state inspector may remove any of said deputies for reasonable cause. It shall be the duty of the inspector and his deputies to provide themselves, at their own expense, with the necessary instruments and apparatus for testing the quality of said illuminating oils, and when called upon for that purpose, to promptly inspect all oils hereinbefore mentioned, and to reject, for illuminating purposes, all oils which will emit a combustible vapor at the temperature of one hundred and twenty degrees of Fahrenheit's thermometer: *Provided,* The quantity of oil used in the flash test shall not be less than half a pint. The oil tester adopted and recommended by the Michigan State Board of Health shall be used by the inspector and his deputies.

SEC. 3. Every person appointed a state inspector shall, before he enters upon the discharge of the duties of his office, take an oath or affirmation prescribed by the constitution and laws of this state, and shall file the same in the office of the secretary of state. The state inspector shall execute a bond to the state of Michigan, in such sum and with such surety as shall be approved by the secretary of state, conditioned for the faithful performance of the duties imposed upon him by this act, which bond shall be for the use of all persons aggrieved by the acts or neglect of said inspector, and the same shall be filed with the secretary of state. The deputy inspector shall, before he enters upon the duties of his office, take such oath and file such bond with like conditions, as is required of the state inspector, said bond to be in such sum as shall be required by the state inspector, with two sureties to be approved by the judge of probate, and file such oath and bond with the clerk of the county in which such deputy inspector resides. Such deputy shall also forward the county clerk's certificate of such filing to said state inspector. Said inspectors shall collect one-half cent for each gallon contained in the barrels, casks, or packages so inspected, and he shall pay over to the state inspector at the commencement of each month, all moneys received by him for inspection; and, in any case of inspection or branding, said fee shall be a lien on the oil so inspected. It shall also be the duty of every inspector or deputy inspector to keep a true and accurate record of all oils so inspected and branded by him, which record shall state the date of inspection, the number of gallons rejected, the number of gallons approved, the number of gallons inspected, the number and kind of barrels, casks, or packages, the name of the person for whom inspected, and the money received for such inspection, and said record shall be open to the inspection of all persons interested. It shall also be the duty of every deputy inspector, at the commencement of each month, to forward to the state inspector and board of state auditors, true duplicate copies of such record for the preceding month. In the month of January in each year, the state inspector shall make and deliver to the governor of the state and board of public health, annual duplicate reports of the inspections by himself and deputies during the preceding calendar year. All illuminating oils manufactured or refined in this state shall be inspected before being removed from the manufactory or refinery; and if any person or persons, whether manufacturer, vendor, or dealer, shall sell, or attempt to sell, to any person in this state, any illuminating oils, whether manufactured in this state or not, before having the same inspected, as provided in this act, he shall be deemed guilty of a misdemeanor, and he shall be subject to a penalty in any sum not exceeding three hundred dollars; and if any manufacturer, vendor, or dealer in either or any of said illuminating oils, shall falsely brand the package, cask, or barrel containing the same, as provided in sections one and two of this act, or shall use packages, casks, or barrels having the inspector's brand thereon, without having the oil inspected, he shall be deemed guilty of a misdemeanor, and he shall be subject to a penalty in any sum not exceeding three hundred dollars nor less than one hundred dollars, or be imprisoned in the county jail not exceeding six months, or both, at the discretion of the court.

SEC. 4. Any person selling or dealing in illuminating oils produced from petroleum, who shall sell or dispose of any empty kerosene barrel, cask, or package, before thoroughly canceling, removing or effacing the inspection brand on the same, shall be guilty of a misdemeanor, and, on conviction,

shall pay a fine of one dollar for each barrel, cask, or package thus sold or disposed of.

SEC. 5. No person shall adulterate with paraffine or other substance for the purpose of sale or for use, any coal or kerosene oils to be used for lights in such a manner as to render them dangerous to use, nor shall any person knowingly sell or offer to sell, or knowingly use such adulterated oil, nor shall any person knowingly sell or offer for sale, or knowingly use any coal or kerosene oil, or any of the products thereof for illuminating purposes, which by reason of being adulterated, or for any other reason, will emit a combustible vapor at a temperature less than one hundred and twenty degrees of Fahrenheit's thermometer: *Provided,* That the quantity used in the test shall not be less than one-half pint: *And further provided,* That the gas or vapor from said oils may be used for illuminating purposes, when the oils from which said gas or vapor is generated are contained in closed reservoirs outside the building illuminated or lighted by said gas. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be punished by imprisonment in the county jail not more than one year, or by fine not exceeding four hundred dollars, or by both such fine and imprisonment in the discretion of the court: *Provided,* That nothing in this act shall be so construed as to prevent the use in street lamps of lighter products of petroleum, such as gasoline, benzine, benzole, naphtha: *Provided further,* That the provisions of this act shall not apply to the use of machines or generators constructed on the principle of the "Davy Safety Lamp."

SEC. 6. The state inspector shall receive an annual salary of fifteen hundred dollars. He shall also be allowed such further sum as he may actually and necessarily expend in traveling expenses and prosecutions incurred in the discharge of his duties. Each deputy inspector shall be entitled to a salary payable monthly, the amount of such salary to be determined by the number of casks, barrels and packages actually inspected by such deputy inspector during the month, as follows: For each of the first ten, one dollar each; for each of the second ten, seventy-five cents; for each of the third ten, sixty cents; for each of the fourth ten, fifty cents; for each of the fifth ten, forty cents; for each of the sixth ten, thirty cents; for each of the seventh ten, twenty-five cents; for each of the eighth ten, twenty cents; for each of the ninth ten, fifteen cents; for each of the tenth ten, ten cents; for each of the second hundred, eight cents; for each of the third hundred, six cents; for each in excess of three hundred, five cents: *Provided,* That in no case shall any deputy inspector receive more than one hundred dollars in any month as such salary. Said deputy inspector shall also be entitled to and allowed all actual and necessary expenses for railroad, stage and steamboat fares incurred in the discharge of his duties as such deputy inspector. All salaries and expenses provided for in this act, shall be retained by the state inspector out of the money received for inspections of oil, and accounted for and paid out by him as provided in this act: *Provided,* That in case the amount of money received for the inspection of oils according to the provisions of this act, shall not be sufficient to pay the compensation and expenses of the inspector and his deputies as provided herein, the amount of such deficiency shall be deducted from said salaries *pro rata* to each.

SEC. 7. The state inspector shall render to the board of state auditors, quarterly, a detailed account of all the receipts and disbursements of his office, to be audited and allowed by them if found correct; and at the e

year, any surplus shall be paid into the state treasury.

SEC. 8. It shall be the duty of the state inspector, or any deputy inspector, who shall know of the violation of any of the provisions of this act, to enter complaint before any court of competent jurisdiction against any person so offending; and in case the state inspector or deputy inspector, have [having] knowledge of the violation of the provisions of this act, shall neglect to enter complaint as required by and provided for in this section, he shall be deemed guilty of a misdemeanor.

SEC. 9. It shall be the duty of all prosecuting attorneys to represent and prosecute in behalf of the people, within their respective counties, all cases of offenses arising under the provisions of this act.

SEC. 10. No inspector or deputy inspector shall, while in office, traffic directly or indirectly, in any article which he is appointed to inspect. For the violation of any of the provisions of this act, he shall be liable to a penalty not to exceed three hundred dollars.

SEC. 11. It shall be the duty of the governor to remove from office, and to appoint a competent person, in the place of any inspector who is unfaithful in the duties of his office.

SEC. 12. Act number one hundred and eighty-one of the session laws of eighteen hundred and seventy-five, as approved May first, eighteen hundred and seventy-five, and act number one hundred and ninety-six of the session laws of eighteen hundred and seventy-seven, as approved May twenty-third, eighteen hundred and seventy-seven, are hereby repealed.

SEC. 13. This act shall take effect thirty days from and after its approval by the governor.

Approved May 31, 1879.

PRIVIES AND WATER-CLOSETS

AT RAILWAY STATIONS.

BY

HOMER O. HITCHCOCK, M. D.,

MEMBER OF THE MICHIGAN

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON DISPOSAL OF EXCRETA, AND DECOMPOSING ORGANIC MATTER.

PRIVIES AND WATER-CLOSETS AT RAILWAY STATIONS.

In the month of February, 1878, the late Dr. J. H. Beech, of Coldwater, addressed to the Secretary of this Board the following letter:

H. B. Baker, M. D., Secretary Michigan State Board of Health:

DEAR DOCTOR:—I have just been writing a letter to the Superintendent of the Michigan Division of the Lake Shore and Michigan Southern Railroad, in part of which I ventured to touch upon a subject which, if the Board of Health have not already considered it, I would respectfully commend to their attention, to wit, the filthy condition of the "out-houses," privies, etc., at many of the railroad stations. I called the attention of the Superintendent to what is now known of the source of "typhoid fever," etc., and suggested that he hold the station agents responsible for daily cleaning of the floors from the nuisances caused by children and night visitors, and for frequent "dusting down" of the vaults, according to the amount of use. I further suggested that some official, whose duty it is to pass over the road for other purposes, should be required to inspect weekly, all "water-closets," etc., and report to the Superintendent's office all cases of neglect on the part of station agents.

If you please to lay this before the President of your Board, and, if his judgment approves, before the full Board, some sanitary progress may be effected. I do not doubt that travelers have been unsuspectingly poisoned, as well as disgusted, by visiting from necessity the only places of seclusion which they could reach.

Very respectfully yours, etc.,

Coldwater, Mich., Feb. 10, 1878. J. H. BEECH, M. D.

A few days after, Dr. Beech forwarded to the Secretary the following communication, written to Dr. Beech in reply to the letter referred to above, by Mr. J. E. Curtis, Superintendent Lake Shore and Michigan Southern Railroad:

SUPERINTENDENT'S OFFICE, MICHIGAN DIVISION,
LAKE SHORE AND MICHIGAN SOUTHERN RAILWAY,
TOLEDO, OHIO, *Feb. 12, 1878.*

J. H. Beech, M. D.:

DEAR SIR:—I was very glad indeed to receive your letter of the 10th inst. As an officer of this company I wish to express my thanks to you for the suggestions you make to me, of a matter that I am well aware is a disgrace and an evil; and no one has tried harder to remedy this than I have. "This fact I have found out, that just as far as we go to make places of this kind cleanly and keep them in order, just so far the public step forward and assist us." I take your letter as evidence of this fact. The remedies you suggest are those that for several years we have tried hard to enforce our men to use, as we know the benefits arising from their use. Unfortunately we have to contend with ignorance and false pride of ignorant men; and, as you are aware, these are the hardest of all things any one has to contend with. The great length of the road makes it hard to know at all times when things of this nature are neglected. I wish I could do more to remedy this matter than I am doing, and I wish that the citizens of every town that our road runs through would make such an outcry that no employé at a station would dare have these places in any other condition than that of perfect cleanliness. Your letter I feel has strength-

ened my hands and encouraged me to stronger efforts, and I shall at any time be pleased to have you criticise matters of this kind. Can you not write and publish an article calling the attention of all railroads and of the public to this matter? I think a great deal of good could be done through your medical society to arouse the attention of every one to the matter.

Yours truly,

J. E. CURTIS,
Supt. Mich. Div.

Dr. Beech's letter transmitting the above, is as follows:

H. B. Baker, M. D., Secretary Michigan State Board of Health:

DEAR DOCTOR:—I enclose these pages to you that the Board of Health may see how railroad Superintendents accept this kind of interference. I do not think it proper for a private physician to publish warnings in newspapers, as Mr. Curtis proposes, lest it should make some people fear contagion, and whenever they could avoid detection, commit the very nuisances which we desire to prevent.

The action or admonitions of your Board would have more influence over officers.

Very hastily yours,

J. H. BEECH.

Both of these communications were referred, at the April meeting of the Board, to Dr. Kedzie as chairman of the committee on "Special sources o danger to life and health." At the October meeting of that year they were reported back to the Board and referred to the committee on "Disposal of excreta and decomposing organic matter," which committee now submits the following report:

When we consider that many cases of typhoid fever and diphtheria, and of other low forms of disease are fairly to be attributed to the foul air from cesspools and privy-vaults, and when we remember how very foul the air is in and about many privies at railway stations, and think how many people are compelled by the necessities of nature to breathe these foul exhalations—not to speak of the extreme disgust to which they are subjected through more than one of their senses,—the matter of the arrangement and the care of these places becomes of public concern and challenges the attention and careful thought of this State Board of Health.

There are many reasons why the arrangement, construction, and care of these necessary places of convenience in conformity to the strict principles of hygiene, are difficult to be attained. Sufficient care is exercised by but very few private families, even, to see that their own privy or water-closet is constructed with a view to real comfort and convenience, and cared for with strict and proper regard for the health of the household. It could hardly be expected, then, that such places at railway stations, designed for travelers who may be compelled for once to use them, or for the employés around the stations, would be of equal comfort, cleanliness, or salubrity with those of private families.

These places are arranged and constructed, and indeed cared for, with the idea that the persons using them will do it but once, or at most seldom, and the thought is not entertained that here by a moment's stay the seeds of disease and death may be taken into the system of many a victim, who, perhaps, in turn may become the center of an epidemic among people far distant from the origin of the disease. Those who use these places, too, think they will use them but once and that for a moment; and, as the stench is already terrible, by reason of careless or thoughtless neglect, or by design, they often leave the place worse for their successors.

I have no doubt that railroad officials, whose duty it is to look after such matters, have, as a rule, as much intelligent interest in seeing that they are conducted in strict conformity to the laws of health as Superintendent Curtis has expressed in his letter, quoted above. One great difficulty seems to be that no person is compelled to take the daily trouble to look after the cleanliness and proper disinfection of the place.

These privies are usually at one end and under the roof of the station-houses, or annexed to them, the apartment for ladies opening out of their waiting-room, while that for the men is approached from without and through an area devoted to urinals. At a few of the most important stations they are, for both men and women, entered from within the station-house, and these generally are in good order and unobjectionable. But at the great majority of stations the nose, even at quite a distance from the house, indicates unmistakably at which end of the building the privy is situated; and many persons while waiting for an approaching train are disgusted and sickened by the odors that they cannot help inhaling, which arise from the putrescent filth in the vault near by.

At the smaller stations the privy is usually a little way from the station-house, placed over a vault which is seldom or never cleaned out or disinfected, and in which the stench from decomposing ordure and urine is sickening, often to vomiting. The floors and seats of these places are often covered and saturated with filth.

CAN THESE PLACES OF NECESSITY AND CONVENIENCE BE SO CONSTRUCTED, SITUATED, AND CONDUCTED AS TO BE ENTIRELY INOFFENSIVE AND INNOCUOUS?

FIG. 1.
Rhoad's Patent Porcelain Seated Hopper.

Privies at the smaller stations should *never be placed over a vault,* unless the privy be moved every year, but should have a trough or receptacle under the seat, which should be removed, emptied, and returned once a week during the hot months and once in two to four weeks during the remainder of the year. THE FLOORS of all such privies as are for public resort should be of some non-absorbing substance, but which can be easily and perfectly cleansed. Tile or cement would probably be the best material to use. THE SEATS in such places should, likewise, be non-absorbent, of a smooth hard surface, easily cleaned and kept so, and of such a form as to forbid the getting upon them with the feet. In the May, 1879, number of the "*Plumber and Sanitary Engineer*" is advertised perhaps the best form of a seat for such a place. The material should be of smoothly glazed porcelain. I refer to "Rhoad's Porcelain Seated Hopper Closet." There is "no woodwork about it;" it has "a perfectly non-absorbent seat." "The shape of the seat prevents a foothold, precluding the possibility of parties standing upon it when using it." A cut of this seat is shown herewith in figure 1.

Every such place under the roof of a station-house, where it is possible, should be a *water-closet,* and so arranged that the bowl or hopper should be flushed either by the act of sitting down upon the seat or by that of opening the door to the closet.

Here I desire again to draw attention to "Rhoad's Porcelain Seated Hopper Closet, supplied by Henry C. Meyer and Co.'s No. 1 patent waste-preventing cistern, arranged to flush when the door is opened." "Just the thing for tenement houses where an ordinary water-closet would be destroyed by the abuse of careless people."

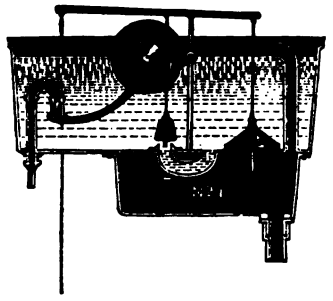


FIG. 2.
H. C. Meyer and Co.'s No. 1 Waste-preventing Cistern. (Sectional view.)

Figure 2 is a sectional view of this cistern. It is placed above the hopper, represented in figure 1, and connected with it in such a way as to secure a flushing of the hopper whenever the latter is used. It may be arranged in such a way as to flush the hopper when the closet door is opened. It is manufactured by Henry C. Meyer and Co., 48 Cliff St., New York, through whose courtesy the committee has been supplied with the plates for figures 1 and 2.

Of course, when the station is within reach of a well-constructed sewer, the water-closet should be connected with it by a soil-pipe sufficiently large, and suitably trapped and ventilated.

THERE SHOULD NEVER BE A VAULT IMMEDIATELY UNDER A PRIVY IN OR ATTACHED TO A STATION-HOUSE.

Where there is no sewer near by, there may be a covered cess-pool at a little distance from the station-house, and into this the water-closet should be emptied through a well trapped and ventilated soil-pipe. The cess-pool should be well covered and with the soil-pipe should be ventilated, if possible, into the chimney of the station-house; if that is not possible, by a large independent pipe rising 12 to 15 feet above the level of the ground. In a porous soil, a large cess-pool, say ten feet in diameter and 10 to 15 feet deep, well walled with large stones without cement, will not become full for years, even at our largest stations. Both the urine and the ordure should be conducted into it. I would add a caution that no such cess-pool should be allowed within 300 or 500 feet of any well where water is drawn for domestic use, and would also say that the danger of contaminating the source of supply of water in a large circle around such a cess-pool is, in the judgment of this Board, so great as ought to forbid its use.

The cisterns of such closets can be easily supplied with water from the tanks used to supply the engines.

Where the soil is not porous, or if a water-tight cess-pool be put in, it will be necessary to empty the receptacle once a year, or perhaps oftener, depending upon the size of the cess-pool. This can easily be done as often, as may be required, by the "odorless excavating-apparatus," as described in my paper on the "Disposal of Human Excreta," printed in the Report of the Secretary of this Board for 1875, or by the Ames Eagle Odorless Excavating Apparatus.

As showing something of the excellence which has been attained in the manufacture of apparatus for the safe and inoffensive removal of human excreta, and, therefore, of the culpability of that neglect and disregard of human health and comfort which allows vaults reeking with their sickening odors and with germs of disease to remain an annoyance to the public or to be made a greater nuisance by injudicious methods of emptying them, three plates (figs. 3, 4, and 5, pages 21, 22, and 23) have been secured illustrative of

apparatus manufactured by the Eagle Odorless Apparatus Company, 622 Sansom St., Philadelphia, Penn. Figure 3, below, represents the apparatus as set up and ready for use in actual removal of the contents of a vault shown at the left hand of the plate. Figure 4 represents part of the "pitting" apparatus, so called, which is used for removal from the pit or vault of such contents as cannot readily be removed by pumping. It consists of a pitting-barrel for receiving the contents of the vault, buckets for removing the contents from the vault, an open furnace for burning the heavier gases, and a close tent to

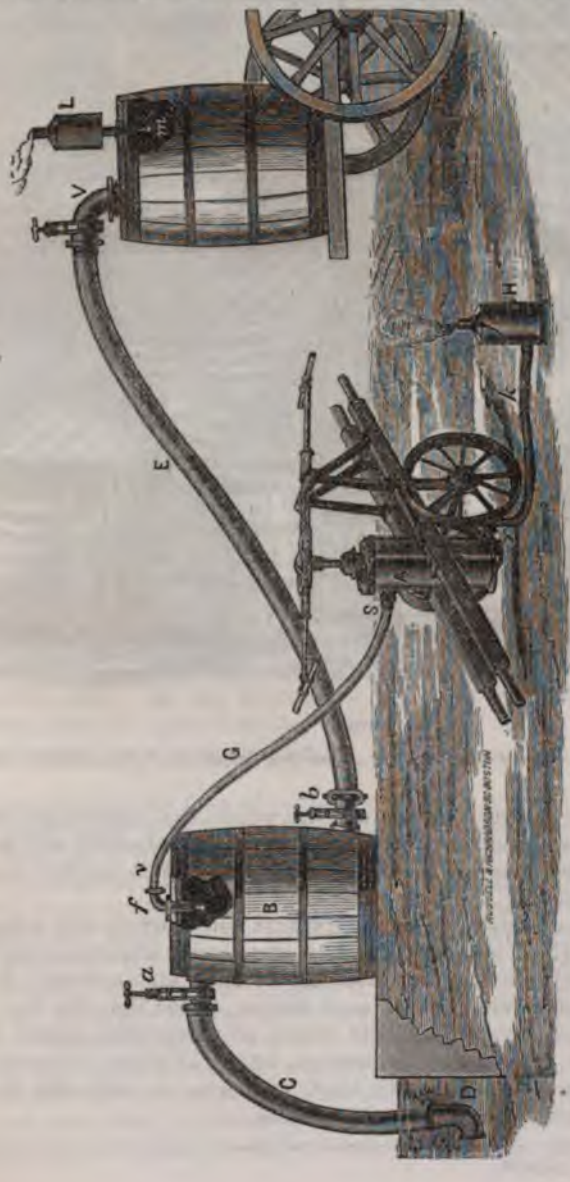


FIG. 3.

Excavating Apparatus of the Eagle Odorless Apparatus Company, of Philadelphia, Penn.

A, the Pump. B, the Pump-receiver. C, the Suction-hose and connections. D, Foot-pipe (submerged). E, Leading-hose and connections. G, Air-hose. H, Furnace-Deodorizer. L, Furnace-Deodorizer. V, Goose-neck valve. *a*, Upper Gate. *b*, Gate.

screen the work from sight and prevent the escape of offensive gases. The pitting-barrel has a close-fitting cover making it air-tight, and a galvanized iron apron to catch all drippings from the bucket when the buckets are emptied and conduct them into a drip-bucket beneath. During the operation the tent-cloth is closely fastened to the ground and to the sides of the privy about the door.* It is claimed for this "pitting" apparatus that when the vault has been disinfected with sulphate of iron (copperas) a few hours previously to the removal of the contents no offense to the senses exists. Plates 3, 4, and 5 have been loaned to the committee through the courtesy of the manufacturers of this apparatus.

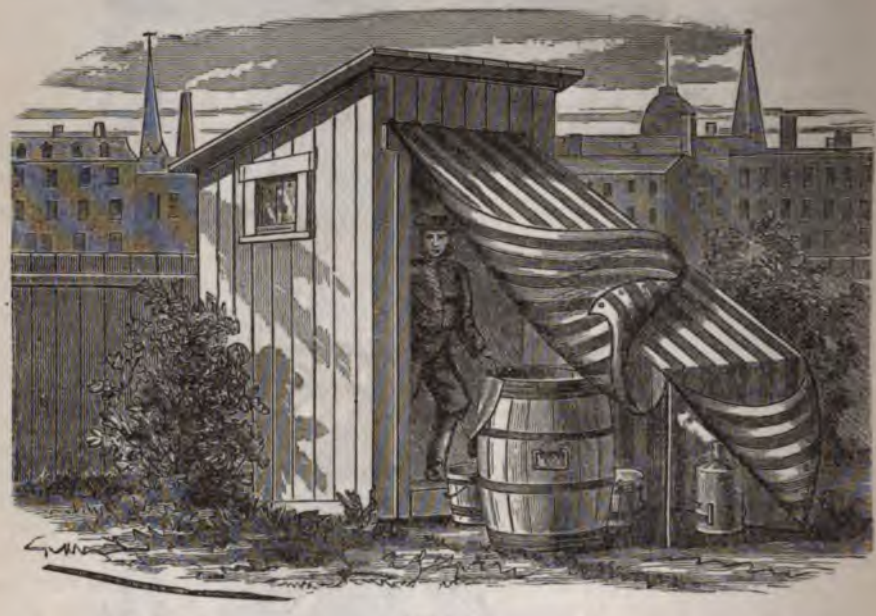


FIG. 4.

Pitting Apparatus of the Eagle Odorless Apparatus Company, of Philadelphia, Penn.

I am sure I have pointed out a way in which the opprobrium of depot privies may be removed, and in which they may be constructed and conducted without offense to the most delicate and sensitive, and in perfect accordance with the laws of hygiene.

How can the care of privies under the present construction and arrangement of them be improved? The duty of daily visiting, and inspecting and putting in perfect order each privy or water-closet at each station-house, should be strictly required of some employé at each station, to see that the floor and the seats are kept completely clean. The vaults or receptacles should be thoroughly dusted down daily with an abundant supply of ashes or dry earth, and should be thoroughly disinfected with lime, copperas, or carbolate of lime as often as twice a week during the warm months.

* As shown in Figure 5, page 23.

FIG. 5.
Tent-cloth Closed for Use of Pitting-Apparatus.

But no care of a vault under or very near to a station-house, however it may be disinfected, can make it consistent with the laws of hygiene. In small stations, and indeed in those of more importance, where the closet cannot be supplied with water, the dry-earth closet of a cheap and simple form should be used instead of a vault. I would here call attention to what is perhaps the cheapest and the best form of the dry-earth closet yet proposed. It is described in a work on "House Drainage and Water Service" (pages 272–3), by James C. Bayles, editor of "*The Metal Worker*"; and also in the "*Metal Worker*" for June 28, 1879. By the courtesy of the editor, Mr. Bayles, a plate illustrating this form of earth-closet has been supplied to the committee. In the "*Metal Worker*" it is thus described:

"The cheapest and best form of earth-closet known to us is shown in the accompanying illustration. It is a box without any bottom, and with a double cover, as shown. The reason for omitting the bottom is, that anything which may spill around the receiver is more easily removed with a broom, by moving the closet, than it would be if the box had to be overturned and so emptied. The receiver is a galvanized coal-hod of large size, and the box needs to be only high enough to allow this to stand within it. When not in use, both covers may be kept closed. When used the outside or top cover is thrown back. After use, the seat is raised and a quantity of dry earth, or the fine siftings of coal ashes, is thrown in with a small fire-shovel. The earth or ashes is kept at hand in a convenient receptacle; or the box may be made in two parts, one for the seat and receiver, and the other for the earth or ashes. The cover of the earth-box should, in that case, be a continuation of the seat, so that when the seat is raised the earth-box is uncovered at the same time. A small quantity of earth or ashes should be thrown into the receiving vessel before it is used, to

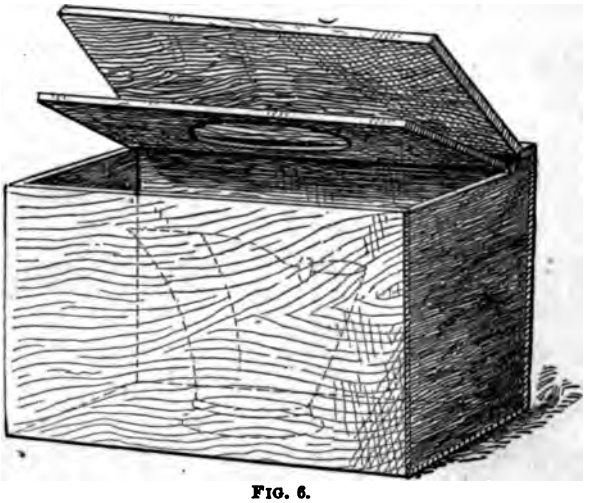


FIG. 6.
A Cheap and Convenient Earth Commode.

absorb liquid excrement, and prevent the solid from sticking to the metal surface. If as much ashes or earth is thrown into the receiver every time it is used as is necessary to cover the offensive matter completely, the receiving vessel will require no attention until it is full. It is then emptied and returned to its place. If the closet is managed with a due regard to decency, the work of emptying is no more disagreeable than that of emptying a bucket of damp ashes. There is nothing about it unpleasant to sight or smell."

If this form of earth-closet should be adopted, of course it would require the faithful daily attention of some employé about the station.

These suggestions are respectfully submitted for the consideration of those persons who have the management and superintendence of railroads in Michigan.

H. O. HITCHCOCK, M. D.,
Committee on Disposal of Excreta and Decomposing Organic Matter.

REPORT OF ATTENDANCE

AT THE MEETINGS OF THE

SANITARY COUNCIL OF THE MISSISSIPPI VALLEY,

AT ITS ORGANIZATION IN MEMPHIS, TENN., APRIL 30 AND MAY 1, 1879,
AND AT ATLANTA, GA., MAY 5–9, 1879;

OF THE

NATIONAL BOARD OF HEALTH

AT ATLANTA, GA., MAY, 1879;

AND OF THE

SECTION ON STATE MEDICINE AND PUBLIC HYGIENE

IN

THE AMERICAN MEDICAL ASSOCIATION,

AT ATLANTA, GA., MAY, 1879.

BY PROF. R. C. KEDZIE, M. D.,

PRESIDENT OF THE MICHIGAN STATE BOARD OF HEALTH, AND ITS DELEGATE TO THE SANITARY COUNCIL OF THE MISSISSIPPI VALLEY.

PUBLIC HEALTH MEETINGS.

REPORT OF PROCEEDINGS OF THE SANITARY COUNCIL OF THE MISSISSIPPI VALLEY, OF THE SECTION ON STATE MEDICINE AND PUBLIC HYGIENE OF THE AMERICAN MEDICAL ASSOCIATION, AND OF THE MEETINGS OF THE NATIONAL BOARD OF HEALTH IN ATLANTA.

BY R. C. KEDZIE, DELEGATE FROM THE STATE BOARD OF HEALTH OF MICHIGAN.

At the last meeting of the State Board of Health, I was appointed a delegate from this body to attend the meeting of the American Medical Association, in Atlanta, Georgia. Before the time of meeting, a call was issued for a meeting of representatives of the State Boards of Health of the Mississippi Valley to meet in Memphis, Tenn., on the 30th of April, for consultation in regard to the best means for preventing the spread of epidemic and contagious diseases in the valley of the Mississippi. By vote of the members of this Board individually, I was requested to represent this Board in that conference. The National Board of Health issued a call inviting representatives of boards of health and sanitarians throughout the country to meet with the National Board of Health at Atlanta, Georgia, on the 5th of May, and during the days of the session of the American Medical Association.

I thus found myself in the way of attending the meetings of three bodies where sanitary matters would be a leading subject of discussion; and in presenting my report of the proceedings, I am embarrassed how to condense the information within the limits usually assigned to such a report. If I should transcend these limits and give too long a report, my only excuse will be the importance of the subjects brought before me.

The newspapers containing daily reports of the proceedings of the various bodies, I have already sent to each member of the Board; also the official report of the Sanitary Council of the Mississippi Valley. It will not, therefore, be necessary in this report to recapitulate the routine work of these meetings. My aim will be to bring forward the facts and principles developed at these meetings, in their relation to the prevention of the spread of infectious and contagious diseases along the lines of commercial intercourse and of travel.

I may say, in passing, that I was most cordially received everywhere,

that the fame of the Michigan State Board of Health had preceded me in the distant South, and that its labors in sanitary science afforded me a passport among all sanitarians. The people of the South were most earnest and emphatic in their cordial welcome to those who sought for some means to stay the march of the pestilence which had so fearfully laid waste city and village alike. At this distance we can form no conception of the wide-spread ruin which overtook them. In the city of Memphis three-fifths of the women were clothed in mourning. When the yellow fever was mentioned in conversation, a solemn awe filled their faces as though the shadow of the wings of the angel of death had fallen upon them. Never in the history of this country was there a better opportunity for advancing the sanitary condition of our country; the fallow ground of indifference and credulity has been broken up, and now is the time to sow the seed of sanitary truth with liberal hand, that it may bear a royal harvest of safety and peace in the near future, and for all time to come.

While the crystallizing point of all the conference and consultation of these sanitarians was the yellow fever, yet the same considerations and precautions obtain for cholera and the oriental plague which once more threatens Europe and possibly the western world. The benefits of such an examination of the fundamental principles of sanitation, and of the conditions, limitations, and accessories of successful quarantine may be as useful for Michigan as for Louisiana. The great lines of travel are highways for cholera as certainly as the lines of commerce are for yellow fever.

The Mississippi River and its branches drain a region as large as Europe. It is a mighty highway of the world's commerce. It is wild to talk of closing it against its natural commercial use for any considerable part of the year; but it is madness to suffer it to become the pathway for pestilence through the vast regions which it drains. Sanitary science with police regulations must keep this watery pathway safe and secure, or else the pitiless hand of mob violence will spread solitude over its turbid waters. A shot-gun quarantine has little science and less mercy; but it is apt to be as thorough as it is remorseless.

The city of Memphis fronts upon the Mississippi river with a high bluff, but the grounds back from the river slope down to what was formerly a branch of the river but is now a stagnant stream, except as it carries off the sewage of the city or the overflow from rain storms. This Bayou Gayoso is practically an *open sewer* which runs the whole length of the city. At the time I saw it (last of April), it was in a most unsanitary condition. The streets of Memphis were paved with that delusive snare, *the Nicholson pavement*. The wood of this pavement, mixed up with manurial and garbage matter of the street and poached with the muddy soil, presented, both to the eye and the nose, evidence of the unsanitary condition of the streets.

Notwithstanding the city had been so terribly scourged by the yellow fever, I could find no evidence that the citizens had made any systematic efforts to remove the unsanitary conditions of the city which made the fever possible or even invited its presence. Some of the large hotels had been thoroughly cleaned, disinfected, and refurnished; but the city, as a whole, was left in its old unsanitary condition. The sanitarians from abroad shook their heads in view of the condition, and earnestly asked when the sanitary reform would begin. But the city had given up its organization in order to avoid its debts, and private and unconcerted action was all their reliance. Yet some of their leading sanitarians were hopeful that sufficient means could be obtained

by private contribution to accomplish the Herculean task of cleansing a foul city.

In conversation with Drs. Mitchell and Maury of Memphis, I found they had little confidence in antiseptics, such as carbolic acid, for the arrest of yellow fever, but great confidence in oxidizing disinfectants, such as chlorine, but especially in *dilution by pure air and ventilation.*

I asked what they thought about the freezing out process by the refrigerating ship at the mouth of the Mississippi river, whereby the hold or inhabited parts of an infected ship, or ship from an infected port, should be cooled for hours below the frost point in order to destroy the germs of fever. They did not feel sanguine of success. Dr. Mitchell called the refrigerating ship "the ice-cream freezer;" but said the plan was untried and "it might prove to be a gnat or an elephant, but it is worth trying because some have confidence in it and will not be satisfied until it is tried." He did not think the case of the U. S. ship Plymouth settled the question, because it was not certain that the hold of the ship was ever frozen out. A similar case occurred a number of years ago in a man-of-war which wintered in New York after having had the fever, yet the fever broke out again when the ship reached a hot climate. The ship again wintered in New York and the fever broke out for the third time when the ship reached a tropical climate. A report from the Secretary of the Navy, made since this conversation, shows that the Plymouth was thoroughly frozen in all parts, but without destroying the fever infection. The facts elicited about the Plymouth have rudely shaken the old ideas of the preventive influence of freezing temperature in respect to yellow fever.

In conversation with Dr. Pinckney Thompson, president of the State Board of Health of Kentucky, I obtained some of the facts about the yellow fever in Hickman, Kentucky. Dr. Thompson said, "If any town in the country ought to have yellow fever it is Hickman, Kentucky. The business part of the city and most of the residences are built upon a side hill; the hill-side is excavated so that the rear of the house is ten feet below the surface; the space behind the house, for thirty to fifty feet, is leveled off for a yard, in which are the privy, cesspool, etc. The houses in the town thus rise tier above tier, and the sewage seeps down from level to level, the floors in the basements of these houses rotting out in from four to six years. Hence the ravages of yellow fever in Hickman last year, when one-third of the inhabitants were attacked by the fever.

In response to the invitation of the State Board of Health of Tennessee, a number of representatives of State and local boards of health met at the rooms of the Howard Association in Memphis on the thirtieth day of April, 1879. Among those present were Drs. Choppin and Holliday, Gen. Bussey, Maj. Fisher, and Mr. Fenner of New Orleans; Dr. Rauch of Chicago; Drs. Thompson and Thomas of Kentucky; Drs. Plunkett, Clark, and Maury and Hon. John Johnson of Tennessee State Board of Health; Dr. Dowell of Galveston, Dr. Taylor of Corinth, Dr. Burke of Helena, Drs. Thornton and Allen of Memphis, Drs. Mitchell and Bemiss of National Board of Health, and Dr. Kedzie of Michigan Board of Health. After the report of the committee on credentials, the question was debated whether we should hold a conference on the subject of quarantine in connection with the prevention or restriction of yellow fever and then adjourn *sine die,* or effect a permanent organization for greater security against the irruption and spread of contagious and epidemic diseases. It was unanimously decided to effect a permanent organization, and a committee of five on permanent organization was appointed, consisting of Drs. Plunk-

ett, Rauch, Holliday, Thompson, and Kedzie. The committee reported the following:

CONSTITUTION OF THE SANITARY COUNCIL OF THE MISSISSIPPI VALLEY.

TITLE.

I. This organization shall be called the Sanitary Council of the Mississippi Valley.

OBJECT.

II. The object of this council shall be to promote Inter-State Sanitation and to prevent the spread of epidemics.

MEMBERS AND FEES.

III. The membership of the Sanitary Council shall be composed of such delegates from State Boards of Health, and other sanitary organizations, as the majority of the council present may, from time to time, elect. The fee shall be ten dollars annually from each organization having representatives in the Sanitary Council.

OFFICERS.

IV. The officers shall be a President, Vice President, and Secretary. All the officers shall be elected annually by ballot, except the Secretary, who shall be elected for a term of three years.

DUTIES OF OFFICERS.

V. The President, and in his absence the Vice President, shall perform all the duties of the presiding officer, and shall call a special meeting of the council at the request of five members representing five different States, one being from each State.

VI. The Secretary shall keep the records, conduct the correspondence of the Council, and perform such other duties as the executive committee may direct. In addition, he shall also be required to perform the duties of treasurer, and shall at each annual meeting render an itemized account of all moneys received and expended.

EXECUTIVE COMMITTEE.

VII. The executive committee shall consist of the President, Vice President, and Secretary, whose duties shall be to carry into effect the directions of the Council and to act for it during the intervals of its sessions and to decide upon the place of each annual meeting.

ANNUAL MEETING.

VIII. The annual meeting shall be held on the third Wednesday in April of each year.

QUORUM.

IX. The delegates from any five States shall constitute a quorum for the transaction of business.

ORDER OF BUSINESS.

X. The order of business shall be as follows:

1. Roll call.
2. Reading and correction of minutes of preceding meeting.
3. Election of new members.
4. Report of executive committee.
5. Reports of special committees.
6. Report of Secretary and Treasurer.
7. New business.
8. Election of officers.

ALTERATION OF CONSTITUTION.

XI. No alteration in the constitution of this Council shall be made except at the annual meeting, and then only by a vote of two-thirds of the members present.

In his opening address, Dr. Plunkett, president of the State Board of Health of Tennessee, spoke of the need of combined effort to guard the great natural

highway of the west from becoming the pathway of pestilence. This river sweeps from State to State in its march to the sea, and no action of any one State could be effectual, but all the States along its banks must combine to keep it free from danger. Dr. Choppin from New Orleans spoke of the great importance of New Orleans as the guard at the front; if this guard is preserved, all in the rear will be in safety; of the need both of *quarantine and sanitation;* that yellow fever is not endemic in New Orleans, but is always the result of direct importation; that if the germs of the fever should hibernate they might produce sporadic cases of fever, but never an epidemic. He assured us that all parties in New Orleans were alive to the gravity of the situation.

On motion of Dr. Choppin, a committee of three was appointed to present topics for consideration by the council. In presenting the report of this committee, Dr. Choppin gave his views in regard to the means by which the Mississippi Valley and the whole country can be guarded against all danger of yellow fever, viz.: by RIGID QUARANTINE *against all infected ports from first of April till October,* or till all danger is passed. He spoke of the great difficulty in enforcing quarantine at New Orleans, especially against the fruit-carrying vessels that bring fruit from the islands in the Carribbean sea. These small vessels find scores of entrances through the numerous mouths of the Mississippi river, and it is difficult or impossible to guard all these entrances.

Dr. Holliday asked why we should quarantine against those islands where the fever never prevails? Dr. Choppin answered, "because the sailors slip over to Balize and thus become infected."

Dr. Choppin's argument may be summed up as follows: Yellow fever is caused by a specific germ which is exotic; if this germ is excluded by rigid quarantine, yellow fever can never prevail in our country: hence *rigid quarantine is our only safety.*

Dr. Holliday replied by quoting the saying of Dr. John Simon of England, that "all systems of quarantine are only *paper plausibilities.*" He spoke of the impossibility of enforcing a rigid quarantine at New Orleans: that, although the yellow fever was originally exotic, yet by reason of its frequent occurrence in New Orleans it had become endemic, and would prevail under unsanitary conditions in that city even if no infection is imported; but that the *disease could never prevail as an epidemic in any part of our country under good sanitary conditions: hence* SANITATION, *and not quarantine.*

The views of Dr. Choppin on one side, and of Dr. Holliday on the other, give a good idea of the two schools of sanitarians at New Orleans. The Sanitary Council seemed to come to the conclusion that *quarantine against infection, and sanitation against the spread of infection* were the right and left hands of sanitary science, with which to grasp and hold the safety and security of our people.

Before presenting the topics for discussion by the Council, Dr. Choppin prefaced the report with a statement of the measures being enforced by the Louisiana State Board of Health to prevent the introduction and spread of yellow fever, and of which the following is the substance:

In accordance with a proclamation issued by Gov. Nicholls on the 10th of April, which went into effect April 30, a quarantine station has been established at a point seventy miles below the city of New Orleans. Vessels coming from ports where yellow fever usually prevails—that is from all ports on the Gulf lying to the south of Texas and all West India, Bahama, and Bay Islands—are subject to a quarantine of twenty days. The regulation includes the vessel itself, the cargo, crew, officers,

and passengers. When a vessel has arrived from any port declared to be infected she is towed up from the mouth of the river to the Quarantine Station, and discharges her cargo at the government wharf. The cargo is then placed in the government warehouse, where it is fumigated and disinfected. The vessel, after discharging her cargo, will also be fumigated and disinfected, and then be allowed to proceed to sea without touching at the port of New Orleans at all. When clear from the Quarantine Station, the vessel will be allowed the privilege of taking on her outward cargo, under the following regulations: The outward cargo will be placed upon a barge at the city and towed down to a point near the Quarantine Station, to be hereafter designated. The barge will there be anchored in the middle of the river, and all persons on board of her removed. Then, after being thoroughly disinfected, the vessel will be allowed to come alongside and take on her cargo with her own crew, and depart. The barge will then be disinfected before being allowed to return to the city.

In the event of any cases of fever breaking out in the city from germs hibernating from the last epidemic, each case will be kept under strict surveillance, and ingress and egress from the house where such case occurs will be prevented by a cordon of sanitary police, so as to prevent the spread of the disease.

Dr. Choppin added that the City Council and the State Board of Health, assisted by the Auxiliary Sanitary Committee, are doing all in their power to place the city in a perfect sanitary condition. The State Board of Health will take pleasure in communicating to other State Boards any information which may be desired.

At the conclusion of Dr. Choppin's remarks, Gen. Bussey claimed the attention of the meeting for a few minutes, and spoke as follows:

MR. PRESIDENT: Before we act on the report of the committee, I desire to make a statement. I am aware that the people throughout the country where yellow fever has existed look to New Orleans as the point of greatest danger, and, in view of past experience, not without cause. Last year, the sanitary condition of New Orleans was as bad as it is possible to imagine; the city authorities believed in the measures adopted by the Board of Health, viz., the use of carbolic acid, etc., but not having revenues sufficient for the work necessary, allowed the city to become unusually filthy. Garbage, which should have been removed beyond the reach of the inhabitants, was dumped on the streets to breed disease. The season was the warmest known for many years, with greater humidity in the atmosphere than usual, producing just the conditions necessary for the spread of the poison. Hence it was that, when yellow fever broke out, it soon spread, and rendered the measures adopted by the Board of Health unavailing.

I want to assure you, gentlemen, and the organizations you represent, that New Orleans is determined to make amends as far as possible, and we hope to gain your confidence in our city as a place where people can live, *every month in the year*, without fear of infectious diseases. The Board of Health has adopted measures to this end, including a rigid quarantine and the strictest sanitary measures. The city authorities are working in full accord, but have not the means to perform the work, except in part. To meet the emergency, the merchants and other citizens of New Orleans have organized a sanitary association, under the laws of the State, to co-operate with the Board of Health and the city authorities in performing the duty. We have called upon the people for voluntary subscriptions, which have been freely given, our banks and insurance companies subscribing $500 to $1,000 each, while our merchants have given from $50 to $500 each, and those less able their small contributions. Fire companies and owners of tugboats and engines have tendered the free use of their engines to aid in flushing the gutters. Our association is purchasing covered carts to supply a deficiency for removing garbage, constructing garbage and nuisance boats, laying pipe on the front of the city with which to flush the gutters, and building flood-gates through which the canals in the rear of the city may be kept supplied with pure water. We have caused to be filled up with river-sand the cemeteries, and those objectionable closed against future burials, and are also purchasing disinfectants for free distribution.

We have invited, and are receiving, the active co-operation of all the benevolent, charitable, and screwmen's associations, numbering many thousand persons, in enforcing our recommendations. We have organized local sanitary committees in every ward, whose duty it is to see to the thorough cleansing of their immediate localities. We have addressed an appeal to every church of every denomination or creed, white or colored, to be read to their congregations, in which we ask every householder in New Orleans to see to the perfect cleanliness of his own premises, and to report every nuisance which may exist to the Association. We have

appointed many inspectors and volunteer policemen, who have been commissioned by the Mayor to aid in the enforcement of city sanitary ordinances. We expect to raise and disburse in this work $100,000.

The enforcement of rigid quarantine regulations against a large part of the trade of New Orleans imposes a heavy loss on the people engaged in commerce in our city. The fruit trade alone was estimated at $100,000 for last week. In view of what we are doing, I hope inland towns and cities will not quarantine against us until it is absolutely necessary for their own protection, as we are doing all that can be done to preserve the health of the city. May I not ask that all the towns in the fever district adopt measures similar to those I have shown you we have inaugurated? I know, from experience, that country towns are liable to become unfit to live in from neglect on the part of those in authority. I remember an instance during the war, when I assumed command at Fort Smith. I found four thousand soldiers camped near the town, with the dead carcasses of twenty-five or thirty animals within easy smelling distance, and the town in a most filthy condition. Much can be done by united effort here in this city and elsewhere to remove the conditions favorable for the reception and spread of yellow fever.

I am aware that New Orleans has been suspected of not always telling the truth about the existence of yellow fever. I want to say here, whatever may have been the facts in the past, there shall be no deception in the future. The Board of Health will make truthful reports, and the association I represent authorizes me to assure you and the public that truthful reports shall be made at all times by that association. The question is one involving the lives of the people, and it shall not be said that we suppress the truth in order to save our trade at the risk of spreading disease to neighboring cities. I have lived in New Orleans thirteen years, and am not acclimated. I have been in New Orleans several times when there have been cases of yellow fever in the city but confined to a limited district. The disease not being epidemic, I felt that there was no danger of taking it. Dr. Choppin has stated that, should sporadic cases appear during the summer, they will be isolated and kept excluded from contact with people who might spread the disease. It is hoped that we may pass through the summer without a recurrence of the terrible scenes which are fresh in the minds of all of you. We can do much to prevent them.

The following propositions were presented by Dr. Choppin, chairman of committee, discussed by members of the Sanitary Council, and unanimously adopted:

I.

This Council approves the action of the State Board of Health of Louisiana and the Auxiliary Sanitary Association of New Orleans to prevent the introduction and spread of yellow fever, and the assurance given by that Board to furnish immediate information to all Boards of Health represented in this Council.

II.

The Louisiana State Board of Health obligates itself to furnish information to all the Boards represented in this Council. Whenever a case of yellow fever is reported to the authorities at New Orleans, the same will be reported by telegram to all the Boards of Health and sanitary organizations represented in the Mississippi Valley Sanitary Council.

III.

It recommends that all the cities, towns, and villages, along the Mississippi River and along the lines of the different railroads emerging from New Orleans, be at once placed in the best possible sanitary condition.

IV.

It is urged upon every inland town to report at once to the nearest Board of Health the occurrence of any and every case of yellow fever which may appear within or near its limits, and the isolation and disinfection of every such case is strongly urged.

V.

It recommends to the National Board of Health the establishment of quarantines at the South Atlantic and Gulf ports where they do not now exist.

VI.

This Council will furnish information to the various towns and cities in the Mississippi Valley when inland quarantine should, in its opinion, be enforced.

The following resolutions were then offered and adopted:

Resolved, That the Sanitary Council of the Mississippi Valley heartily indorses the bill now before Congress "to increase the efficiency of the National Board of Health, and to prevent the introduction into, or spread within, the United States, of contagious and infectious diseases," and would respectfully recommend its speedy passage by Congress, so as to clothe the Board with executive, as well as advisory powers.

Resolved, That this Council is in hearty sympathy with the National Board of Health in its object of securing the restraint of pestilential epidemics in the whole country, and pledges itself to a hearty coöperation with the National Board of Health in this noble work.

Resolved, That a copy of these resolutions be sent to the State delegations in Congress, of each of the States represented in this Sanitary Council, respectfully requesting their assistance in securing legislation which shall protect our people from foreign pestilence and domestic danger.

Dr. Kedzie—premising that he did not wish to be chairman of the committee—offered the following resolution, which, with the amendment of Maj. Fisher, was adopted:

Resolved, That a committee of three be appointed by the chair to prepare an address to the cities and towns of the Mississippi Valley, setting forth the necessity of immediate sanitation in every city and municipality of the valley, and the means and methods of such sanitary reforms.

Amendment by C. G. Fisher: That all such cities, towns, and villages in the Mississippi Valley be urgently requested to immediately appoint and authorize some board or person in their respective communities to place themselves in correspondence with their respective State Boards of Health, which person or board shall make prompt and truthful reports of all cases of yellow fever, or any other infectious disease, occurring in their locality; and that no quarantine be established without consultation with or by advice from the State Boards of Health, and that Citizens' Sanitary Associations be organized in all such towns.

Drs. Holliday, Maury, and Kedzie were appointed said committee. The committee submitted the following address on

GENERAL SANITATION.

DRAINAGE.—A thoroughly-drained soil is all important. This should be secured where practicable by a complete system of sewers or underground drains. If this is not practicable, superficial or surface drains should be properly located, and frequently examined, so as to insure cleanliness and effectiveness.

It is of the first importance that dwelling-houses should be built on dry ground so elevated that there shall be no possibility of an accumulation of stagnant water under the floors at any time.

Constant inspection of houses, cellars, yards, and outbuildings is imperative, so as to prevent the accumulation of filth, garbage, or masses of decomposing organic matter so prejudicial to health. It is equally necessary that some means be devised for the disposal of the same, so as to render it harmless.

WATER-CLOSETS AND PRIVIES.—*Foul odors are Nature's signal of danger.* Water-closets should be properly constructed, kept free from odor and always plentifully supplied with water. The waste-pipes should be wholly disconnected from all other pipes, and provided with independent ventilation. They should be so located as to avoid all possibility of polluting the air of any other part of the house.

Where privies are used, they should be built *above ground with water-tight vaults*, kept always free from foul smell by the liberal use of *dry earth* sifted upon the contents, or by the use of a solution of copperas. They should be emptied at least twice a year or oftener if the contents accumulate to more than one-third the capacity of the vault. The walls and ceilings should be thoroughly whitewashed.

Instead of ordinary privies, the *pail-system* in general use in many of the manufacturing towns of England is recommended as being found to combine economy, sim-

plicity of construction, easy management, with great facility for removing contents without odor or inconvenience.

Privies should be so placed as to prevent their exhalations from contaminating the air of houses or polluting the sources of water-supply from wells or cisterns.

WATER-SUPPLY.—"Water, next to air, is the chief necessary of life." We may even place it before food, because all food is largely composed of it; and it is required, too, for personal cleanliness, and for the purification of our houses and their surroundings.

Running streams and springs, which are the best sources of water-supply, should be frequently examined, in order to detect otherwise unsuspected causes of pollution.

Cisterns should be constructed of suitable material, carefully built and covered, and so placed that no foul air can pass through or over the water they contain. The overflow pipes from cisterns should be free from connection with any other pipes. Roofs and gutters supplying cisterns must be frequently inspected, and some simple contrivance should be adopted to insure their careful cleansing, before the water is allowed to run into the cistern. Cistern-water ought to be frequently examined and kept free from color, odor, or other indications of impurity.

Wells are the most dangerous sources of water-supply, for few wells are safe from surface pollution. Wells should, therefore, be properly located, to avoid all possible risk of contamination from their surroundings, carefully built with elevated curbs and covered tops. The water they contain should be examined at short intervals.

A simple method of examination is by dissolving a lump of loaf sugar in a quantity of the suspected water in a clean bottle, which should have a close-fitting glass stopper. Set the bottle in the window of a room where the sunlight will fall on it. If the water remains bright and limpid after a week's exposure, it may be pronounced fit for use. But if it becomes turbid during the week, it contains enough impurity to be unhealthy. Such water should not be used for drinking purposes until it has been boiled and filtered; after which it should be aerated by any simple process, such as pouring several times from one vessel into another in the open air. The addition of a solution of permanganate of potassa will also serve, in most cases, to sufficiently purify water for drinking purposes. Eight grains of the permanganate to one ounce of distilled or boiled water will make the solution. Add one drop of this to half a pint of the suspected water; if the red tint disappears in half an hour, add another drop. For every drop that loses its color in the half pint, there will be from one-half to two grains of organic impurity in one gallon of the water. If such water must be used, drop in the permanganate until the red tint remains; the solution in this proportion is not injurious, nor does it taste unpleasantly.

DWELLINGS.—The prime conditions of health in a house depend upon *cleanliness, pure air, and unpolluted water;* the prompt and thorough removal of all refuse; and the perfect exclusion of all foul matters arising outside the house.

Good ventilation is absolutely necessary. Rooms should be frequently aired, and a *daily* visit from Dr. Sunshine encouraged. Overcrowding is a fruitful source of air-pollution in dwellings.

Zealous attention should be paid to cellars, pantries, and passages. Mold, dampness, and foul smells are never to be neglected. The sun's rays, free ventilation, and a lavish use of whitewash are excellent scavengers.

The floors of dwellings should be frequently washed. Choose for this purpose a dry day; doors and windows to be left open during and after the operation until thoroughly dry. The floors of dwellings should always be raised from three to four feet above ground, so as to insure perfect ventilation beneath, and the site should be higher than the surroundings, so as at all times to prevent dampness or presence of stagnant water.

DISINFECTANTS AND DEODORANTS.—More than half of these agents are valueless in preventing disease, and dangerous as being productive of false security.

Heat and *pure air* are the best of all disinfectants. Where other agents are necessary, the following list will be found useful:

Copperas can be used almost anywhere, cheap and efficient. Especially useful in privies, etc. Ten pounds in a pailful of water; a teacupful in bed-pans, chambers, etc., after being used. A quart a day in privies, urinals, etc., for ordinary purposes. In dangerous diseases, add from a pint to a quart to each discharge. The contents of a privy six feet in diameter and twelve feet deep, will require twenty pounds of copperas to disinfect it.

Quicklime and gypsum or *land-plaster*, are good absorbents, and may be used advantageously in damp places, cellars, gutters, etc. They should not, however, be used in drains, catch-basins, sewers, soil-pipes, etc.; nor where they are liable to be

washed into such places, lest they, by decomposing soap-water, form lime-soap and obstruct the passages.

Charcoal is one of the best deodorants, absorbing large volumes of gases. May be used in powder, mixed with lime or gypsum, and sprinkled freely in malodorous localities. Suspended in a basket, in cisterns, meat-safes, dairies, etc., it tends to keep the contents from absorbing foul odors. Charcoal should be frequently reheated to drive off the absorbed gases and renew its efficiency.

Carbolic Acid and the coal-tar disinfectants are only admissible for outdoor use, on account of their odor. Mixed with gypsum, they are valuable around stables, out-buildings, etc. A gill of carbolic acid in a pailful of water may be used to flush sewers, drains, etc., and in privy-vaults and catch-basins.

Chloride of Lime is sufficiently well known not to need special mention here, except to say that its value is greatly over-rated. The addition of strong vinegar or dilute sulphuric acid (oil of vitriol) materially increases its efficiency.

Chloride of Zinc may be used instead of copperas, and has the advantage of neither bleaching nor staining white or colored fabrics with which it may come in contact. On this account, it is especially useful in disinfecting clothing, bedding, etc.

Of the large number of proprietary preparations sold for disinfecting purposes, it is not necessary to treat in this connection. If further information is needed, consult your sanitary officer or family physician.

IN GENERAL.—Should desease, however, in spite of every reasonable care, break out in our midst, allay fear and prevent panic, which is always senseless, demoralizing the well and jeopardizing, to an incalculable extent, the lives of those who may fall sick. "In a sick-room there should be wise heads, willing hands and loving hearts in the attendants, and thankful submission, with common sense, in the patient."

The following general directions are useful in contagious or infectious sickness:

1. The sick person should be restricted to one room, or a part of the house separated from the other inmates.
2. Secure proper ventilation of the sick-room, without producing draughts. *Smell* is an excellent guide as to state of air; if air is *sweet* there is but little dread to be felt.
3. The virulence of any poison which causes the spread of disease is greatly increased by concentration in *close rooms* and decreased by dilution and free circulation of air.
4. The linen, clothing, bedding, utensils, and every object touched by or in contact with the sick, should be isolated, and such as will permit, should be thrown into boiling water, there to remain for at least half an hour.
5. The nurse should be restricted to the sick-room or otherwise isolated.
6. Remember that disease is communicated by both the poisoned air about the sick, by the clothes and other articles used or touched by them.
7. After the patient leaves the sick-room it should be purified and disinfected. *Boil* everything that will admit of it; scald all utensils; scrub the floors; whitewash ceiling and walls. Empty the room entirely and leave doors and windows open for at least a day or two.

In conclusion, we would advise, where practicable, the formation of associations for *sanitary protection*, such as are now in successful operation in Edinburgh, and in Newport, R. I. A trifling yearly subscription entitles each member to the valuable services of a skilled sanitary engineer and sanitary inspector, whose advice enables him to carry out all improved methods of sanitation they may suggest.

(Signed,) D. C. HOLLIDAY, M. D.
R. B. MAURY, M. D.
R. C. KEDZIE, M. D.

The Sanitary Council adjourned to meet in Atlanta, Ga., on the 5th day of May, to attend the meetings of the National Board of Health, and to transact such business as might come before it.

PROCEEDINGS AT ATLANTA.

MARITIME QUARANTINE.

By invitation of the National Board of Health, the Sanitary Council attended their meetings and participated in the discussion of the subject of quarantine, which was the leading topic.

Maritime quarantine was first considered, and Dr. J. S. Billings, Vice President of the National Board, presented the following topics as outlines for the discussion of maritime quarantine:

1. Points to be observed in reference to the sanitary condition of a ship while in a foreign port in an infected district.
2. Points relating to the management of a vessel on its passage from an infected port.
3. Inspection and detention of an infected vessel on arriving in port.
4. Treatment of men and passengers.
5. Treatment of cargo.
6. Treatment of ship.

The discussion was opened by Dr. Vanderpoel of New York, who spoke of the difficulties in establishing a national quarantine, but said that these difficulties are not insuperable. It is a misfortune that the name *quarantine* (40 days) embraces the *idea of time* as the main element, whereas, time is not the prominent element in rational quarantine. In discussing the subject of quarantine we must at the outset draw a sharp line between the *sanitary* regulations and the *police* regulations of quarantine. National quarantine must relate to *sanitary regulations* to be observed in all parts of the United States, and leave to the several ports to arrange in regard to all police regulations.

Quarantine does not necessarily imply detention, except for two purposes:

(a.) Sufficient detention to remove all infectious matter;

(b.) Detention during "the incubative period."

Dr. Vanderpoel said there were many points of difference in the sanitary management of sailing vessels and steamers, and proposed to consider these two classes of vessels separately.

I.—SAILING VESSELS.

1. *Sanitary condition of vessels in foreign ports, and the means of preventing the infection of vessels in foreign ports.* Some vessels almost always bring infection, and others almost never. The difference is in the management of vessels and men when in foreign port: often the vessel lies for one to five weeks waiting for a cargo, and the men are allowed to go ashore, and are exposed to all means of infection, while the vessel is often in the unhealthiest part of the harbor. If the vessel is kept in good condition by daily pumping out the bilge-water and pumping in water till the bilge is clear, there is little danger, for the bilge is the especial nidus of the infection of fever. The officers must look after the diet of the men, and compel them to come on board before nightfall, and prevent their sleeping on deck; make the men every night take off their soiled and sweaty flannels, take a sea-bath, put on clean flannels, and sleep below deck; keep their bowels regular by daily evacuation. If these precautions are observed the men are apt to escape the fever.

Dr. Billings asked how many vessels coming to New York take these precautions? Are the vessel-owners repaid for this expense by increased saving and profit?

Dr. Vanderpoel.—In the West India trade very few vessels observe these precautions; it is very difficult to answer whether they are repaid by increased profit.

Dr. E. L. Howard of Baltimore.—I will answer Dr. Billings' question so far as Baltimore is concerned. Of the Rio vessels, two-thirds observe them; of the West India vessels, almost none, and the vessels in the sugar and molasses trade are very filthy. I question the statement that the bilge is the nidus of the fever-germ. I look rather to the filthy body-clothing of the men, and their foul quarters in the forecastle.

Dr. Nash of Norfolk, agreed with Dr. Vanderpoel, that the bilge is the source of danger in spreading contagion or carrying infection on shipboard.

Mayor Cobb of Pensacola.—I agree with Dr. Vanderpoel, that we cannot fix a limit of time for quarantine. In regard to the care of vessels in foreign ports, we never allow the men to go ashore before midday and to return before night-fall, and never let them sleep on deck. I think there is often danger from bilge-water, but more often from infected and foul forecastle.

Dr. Vanderpoel.—2. *A vessel in passage* should have her bilge daily pumped out and removed by fresh water till the bilge is pumped out clear. Keep the living apartments of the vessel well ventilated, and the bowels of the men in reasonably active condition because the fever-poison often seems to be carried out of the system by the alvine evacuations.

Dr. Vanderpoel.—3. *A vessel arriving in port from an infected district* is detained 48 hours in quarantine to afford time to examine, clean up, and disinfect the ship (by chlorine rather than by sulphurous acid); the hatches are opened, and the hold fumigated throughout repeatedly, at least twice a day; the ship is then sent forward to be unloaded by lighters as soon as possible. The stevedores are kept at the lighterage ground for the entire season, and not allowed to leave the station; the same is true of the coopers who work in the holds of infected vessels. After the vessel is unloaded, the ship is scrubbed, the sides washed down with a stream of water from the hose of a steam-pump, the scrubbing brush following the stream of water till the whole inside of the ship is thoroughly washed out; the bilge-water is pumped out and clean water pumped in till the water comes off clear; the ship is again fumigated and then discharged. In this way the infected ship never comes to the city, but is cleaned, disinfected, and send abroad in the best possible sanitary condition.

Dr. Vanderpoel said that there never was a space of three days in the summer when there was not yellow fever in the port of New York, and yet it was kept out of the city by a thorough quarantine.

Dr. Howard.—In Baltimore, we fumigate the cabin and forecastle by burning sulphur, pump out the bilge and flush and pump till the water comes off clear; then fumigate the hold with sulphurous acid. If any one on shipboard has the fever, the clothes, bedding, etc., are saturated with coal-oil, taken ashore and burned. The cargo seldom becomes a means of spreading fever.

Dr. Vanderpoel confirmed this last statement.

Dr. Billings.—Are there any rules as to which we shall use for disinfection, chlorine or sulphurous acid, the relative activity of each, and the quantity we should use to disinfect a ship's hold?

Dr. Vanderpoel.—We use one or the other indifferently, but as chlorine is very diffusive and easily made, we commonly use it. We place the dry black

oxide of manganese in shallow lead pans in the hold, and the men pour muriatic acid from jugs on the oxide of manganese, and leave the mixture to form chlorine.

Dr. Nash of Norfolk.—I use 100 lbs. of sulphur to fumigate the hold of a ship, and the gas could be seen to pour from every seam.

Dr. Turner.—An ounce and a half of sulphur will fumigate 100 cubic feet.

Dr. Billings.—Eighteen ounces of sulphur to one thousand cubic feet will destroy bacteria.

Dr. Cleeman.—We use a "charcoal disinfectant," consisting of carbon, iodine, bisulphide of carbon, and carbolic acid; burn this for fumigation, wash out the hold with water containing one-fortieth of its weight of carbolic acid.

To this mode of disinfection I find the following objections: that when bisulphide of carbon is burned only carbonic acid and sulphurous acid are formed, the carbonic acid is useless and the sulphurous acid of no more use than that made by burning sulphur alone, which is a much cheaper article; that iodine is a costly substance as compared with chlorine, while chlorine is vastly more active as a disinfectant than iodine, and that if any substance of this class is to be substituted for chlorine, *bromine* is a much more promising substitute than iodine, being cheaper, more effectual, and easier applied.

Mayor Cobb.—In Pensacola we find great danger from discharged ballast. As almost all the commerce of Pensacola is out-going and not in-coming, the vessels come in ballast and discharge great quantities during the year. Ballast is almost any kind of earth or dirt, and if it contains vegetable matter it becomes dangerous when discharged from infected vessels. Ballast is discharged freely in any place from Dec. 1st to May 1st, and is used to fill up wharves, etc., but from May to December it is required to be discharged seven miles at sea; but our legislature has lately passed a law requiring ballast to be discharged *on land*, while we have thousands of acres of harbor which will never be used and which might safely receive this infected ballast.

Dr. Vanderpoel.—In New York we require such ballast to be deposited in sea-water below low-water mark.

II.—REGULATIONS WITH RESPECT TO STEAMERS FROM INFECTED PORTS.

Dr. Vanderpoel.—Steamers are less liable to become infected than sailing vessels, for the following reasons: 1. They belong to fixed lines, sailing at stated times, and hence are only for a short time in port, and there is not time enough to acquire or develop infection; 2. Better discipline is maintained than on sailing vessels, and the duties of officers and men are better defined; 3. They have better appliances for sanitation, steam pumps, ventilators, etc.

We make steamers observe five days in coming from Havana, either in passage or quarantine, before they are permitted to land. The five days cover the incubative period of the fever, and if infection is aboard it will be developed in that time. If the steamer has sick persons, their clothes are changed and they are then taken to hospital where their clothes are again changed, so that no infected clothing can possibly go into the hospital. The clothes are disinfected and washed.

Dr. Folsom said a similar course was pursued at Boston, but infected rags were not allowed to land before being disinfected.

Mayor Cobb.—The freight business is fast passing into the hands of steamers, and these often lie in port and become infected the same as sailing vessels.

Dr. White of New Orleans, spoke of the danger from the Alexander steam-

ers sailing from New York by Havana and New Orleans to Vera Cruz, and their liability to carry the infection from port to port. Our quarantine should be *in transitu* rather than in port; the vessels should be kept in the best sanitary condition during the voyage; the health officers on shipboard and the local health officers must be clothed with full powers.

A PLAGUE!

At this point, the chairman announced that Dr. Chancellor of Baltimore, desired to read a paper on the Plague, and that the reading of the paper would take about twenty minutes. Dr. Chancellor then proceeded to read his paper, which was a rambling affair and took more than an hour in the reading. His most salient points were the following: "Decaying vegetable matter will produce malarial fever; decaying animal matter will produce typhoid and typhus fevers; decaying animal and vegetable matter when combined will produce plague or yellow fever when the germ of either is added." He denied the infectious nature of plague and yellow fever, and derided quarantine, which he spoke of as "forty days' detention." He was finally called to order by Dr. Vanderpool, who said Dr. Chancellor had asked for 20 minutes and had already consumed an hour; he doubted if the National Board desired to hear anything more about Dr. Chancellor's views on quarantine, "for the quarantine he describes has not been in existence anywhere on the face of the earth for the last 25 years." Dr. Chancellor however was permitted to finish the reading of his paper.

A TALK WITH DR. BILLINGS.

In a conversation with Dr. Billings on the subject of maritime quarantine, he made the following statements, which I consider of great value: The quarantine to be established by the National Board of Health must be uniform for the whole country in consequence of the requirements of the U. S. Constitution. It is therefore necessary to be very guarded in the action of the National Board lest requirements which are essential for New Orleans and Mobile may destroy the commerce of New York and Boston. It is proposed to make such *sanitary* regulations as may and should be enforced in all places, and only such *national restrictions* by quarantine as will not disturb commerce seriously; and for any stringent quarantine in points especially threated, to secure action by state and local quarantine.

One special and needless source of danger is in keeping freight on board during quarantine, and not taking out all goods, disinfecting them, and cleaning and disinfecting the ship. The ballast may be a special source of danger where ships come in ballast for a cargo. The ballast is often unloaded for dock-filling, and may deposit infection, as was probably the case in Savannah in 1875. The ballast should always be deposited in places free from all danger of spreading infection, for example, in deep sea water, or in water many feet below low-water mark.

The tendency of modern quarantine is to substitute DISINFECTION AND PURIFICATION IN PLACE OF DETENTION. This is the pivotal point in the whole discussion of modern quarantine.

ADDRESS OF DR. ROCHESTER.

The able address of Dr. Rochester, Chairman of the Section on Practical Medicine, in the American Medical Association, on "The Limitation and Prevention of Epidemic Diseases," gives force and meaning to the demand for some system of quarantine which shall fence out cholera, yellow fever, and the dreaded oriental plague, and some system of sanitation which shall forbid that these exotic diseases shall become endemic. I am only able to present a synopsis of this masterly address.

The conflict between moneyed interests embraced in commerce and trade on the one hand, and public safety on the other, is often bitter and sharp; but often moneyed interests are compelled to array themselves on the side of a prudent conservation of health, when it is found that the money cost of the yellow fever epidemic of last year is estimated at $200,000,000, to say nothing of the mourning, lamentation, and woe which spread through so large an extent of our country.

Quarantine, without sanitation, may be a serious tax upon commerce without any corresponding benefit to the public health. Consider the sanitary condition of New Orleans preceding the late epidemic of yellow fever, as given by Dr. Holt, Sanitary Inspector of 4th District: "There is hardly a privy-vault in New Orleans but whose contents have free access to the soil to saturate the ground with liquid ordure. Specimens of subsoil water, taken from different depths, as low as 95 feet, and from different parts of the city, have been carefully analyzed by Prof. Joseph Jones, and have yielded a large percentage of urea and organic matters, the products of animal excretion, fully fifty-three grains to every gallon. 'It is evident,' he says, 'that these waters are suitable neither for drinking, nor for washing, nor for cooking. In fact they are as bad, if not worse, than the drainings of grave-yards.' During wet weather these vaults or sinks quickly fill with water and overflow, flooding yards and gutters with ordure. Under a sun almost tropical one-half of the year, this ferments and emits a most abominable stench, which, of all others, must be a most fruitful source of disease, operating directly in its production and indirectly in lowering the vital stamina of the inhabitants. While in wet seasons these vaults are flooded, in dry weather they are largely emptied by their fluid contents soaking into the ground, thus saturating the soil upon which we live with human excrement. In this respect it may be properly stated that the people have a huge privy in common and that the inhabitants of New Orleans live upon a dung-heap. The street-gutters. cow stables, low lots, and houses with floors resting on the ground are of a piece with the 'privy in common.' Locust Grove Cemetery contains one square of ground in which are buried the pauper dead of the entire city; it has been in use for many years, and the same graves are made to receive the bodies of many dead—as many as six occupying a single grave! I myself, making an inspection, witnessed the burial of a corpse. The grave was prepared by uncovering a coffin, opening it, raking the bones together, and throwing them out; breaking up and prying out the old coffin, and depositing the new in the mould of the former. When laid in its uncertain resting place, the lid of the box, like that of the one preceding, was two inches below the surface of the earth. To hide it, the earth formerly removed was piled upon the coffin in a mound about two feet high.

"The citizens living in the vicinity presented a petition to the city council, March 13, 1877, wherein they set forth, in the strongest terms, the horrible facts relating to this grave-yard; how that, in summer season, the stench from human bodies pervaded their houses; that, whether eating or sleeping, indoors

or out, they were ever in an atmosphere heavy with the exhalations from the dead. They pictured the disgusting sights presented and forced upon the gaze of themselves and their children. They referred to their pitiable condition during an epidemic, when the putrefying dead were piled in heaps under a blazing sun, awaiting burial, and the overburdened earth reeked with rotting human flesh, while clouds of flies swarmed back and forth upon the graves and *upon their tables!*

"The action of the city council upon this petition was the mere extension of a square of ground adjoining the cemetery, a low marsh, where the sexton performs his heavy task faithfully as best he can; sometimes floating to their graves the dead and weighting them into their homes, the whole graveyard being often a foot under water—an injurious infliction and outrage upon the living, a disgrace to our humanity, to our morals, and to our city!"

Surely the poor wretches buried there would need "hope as *an anchor" of the body* as well as "of the soul!" It is gratifying to learn that the Auxiliary Sanitary Association of New Orleans have succeeded in causing an abatement of this horrible intra-mural graveyard, and that Locust Grove Cemetery has been covered two feet deep with earth, and sown with grain and grass. All interments are now made in a new cemetery three and a half miles from the city.

With New Orleans, or any other city, in the sanitary condition described, how could quarantine alone keep the fever out of such a city? What is the pestilence for, except to sweep clean so foul a place? But QUARANTINE WITH SANITATION, may keep out the pestilence, and with very little tax upon commerce, as Dr. Vanderpoel has demonstrated in New York.

INLAND QUARANTINE.

The subject of inland quarantine was mainly discussed in the Sanitary Council, but many members of the National Board of Health and distinguished sanitarians, participated in these discussions and endorsed the conclusions arrived at in the Council. The following propositions embrace the results of the discussion:

I.—STEAMBOAT NAVIGATION.

SANITARY INSPECTION OF STEAMBOATS CARRYING PASSENGERS AND FREIGHT FROM THE GULF PORTS INTO THE INTERIOR.

Proposition I. Every captain or commanding officer shall keep in a book of permanent record the sanitary history of the steamboat from the 1st of April to the 1st of December inclusive. Such captain or commanding officer, before leaving a sea-port city or town, shall obtain a certificate from a medical inspector, which certificate shall be entered upon and form a part of said record, certifying that he has personally examined the steamboat, and that all the rules and regulations adopted by this Council, relating to the cleansing and disinfection while at the docks and wharves of a city or town, have been complied with. Said certificate shall also state that the cargo of freight, of whatever description, is in good sanitary condition, and may be safely transported to its point of destination.

Proposition II. The captain or commanding officer shall daily enter upon this record all facts relating to the health of the passengers and crew, and the amount and kind of sanitary cleansing during the passage; and the captain or commanding officer may be compelled to verify by affidavit at the time of inspection the correctness of the daily record.

Proposition III. The re-inspection of said boat shall be required only at the point of destination (except as hereinafter provided), at which point the medical inspector shall examine, before she discharges her cargo, the sanitary record of the boat and the boat itself. If such record has been neglected and the boat is in a bad sanitary condition, the medical inspector shall require proper sanitary cleansing before the cargo is discharged or a new cargo is put on board. On the return passage, the same rules apply.

Proposition IV. All boats navigating the Mississippi river shall undergo inspection and re-inspection, in the same manner as above provided, upon arrival at New Orleans, Vicksburg, Memphis, Cairo, and the point of destination.

Proposition V. Whenever yellow fever or cholera prevails at any of the Gulf ports, the medical inspector shall certify on the record the precautions that have been taken and the danger to be apprehended from cargo, passengers, and crew. The re-inspection must be made at least one mile from a town, at a point suitable for the care of the sick, detention of the well, and the disinfection and cleansing of cargo and boat.

Proposition VI. The foregoing rules and regulations shall also apply to tugs, tows, and barges.

II.—RAILROAD TRAVEL AND TRAFFIC.

SANITARY SUPERVISION OF RAILROADS AND OF TRAVEL AND TRAFFIC BY RAILROADS.

Proposition I.—Concerning the Sanitary Care of Depots, Stations, Round-houses, Car-shops, Grounds, etc.: At all seasons of the year, the depots and surroundings shall be kept in a good sanitary condition, the grounds well drained and free from stagnant water and decomposing organic matter; the water-closets and privies shall be daily inspected by the local railroad agent or official, who shall cause the floors, seats, and urinals to be kept clean and free from all offensive odor; the vaults of privies shall be emptied often enough to prevent any large accumulation of excremental matter, and shall be disinfected every week by pouring into the vault a saturated solution of the sulphates or chlorides of iron or zinc, in sufficient quantity to remove all offensive odors.

Proposition II.—Concerning Railroad Quarantine: 1. Whenever a railroad train departs from an infected station, no person with fever shall be allowed to take passage on such train. The baggage from such infected station shall be thoroughly disinfected before leaving such railroad station. At a point not less than fifty (50) nor more than seventy-five (75) miles from the point of departure from an infected place there shall be an entire transfer of passengers and baggage to another train of cars, which train shall never enter an infected district. This transfer shall be made under the supervision of a medical officer. No person with fever shall be allowed to proceed on this train, but shall return to the point of departure or be treated in hospital at the place of transfer.

2. No sleeping-car shall be allowed to remain in an infected town, nor shall any sleeping-car approach nearer an infected place than this point of transfer. Any passenger-car leaving an infected place shall be thoroughly ventilated during its passage to the place of transfer by having not less than one-half the windows of the cars open during such passage.

3. The upholstered seats of passenger and sleeping cars, and the mattresses and pillows of sleeping-cars shall be thoroughly whipped or beaten (in the open air so far as practicable), and brushed free from all dust, and thoroughly aired and sunned at the end of each trip; the blankets and curtains of all sleeping-cars shall also be beaten and aired in the same way. In case of infection of a passenger-car or of a sleeping-car, all the upholstery, cushions, curtains, bedding, mattresses, etc., shall be thoroughly disinfected, under the supervision of a medical officer, before being again used.

4. The cars which carry freight without breaking bulk, may pass without transfer, if the freight cars are ventilated in such a way that a constant current of air passes through the whole length of the car during transit. Way freight shall be transferred at a point not exceeding fifty (50) miles from the point of departure, and the cars from which such freight has been transferred shall not proceed further on the road, but shall be returned to the point of departure. During the existence of an epidemic of yellow fever, the freight-cars, after unloading, shall be thoroughly cleansed by scrubbing and sprinkling with carbolic acid, or fumigated and disinfected and then painted.

5. All railroad cars should, at all times, be well ventilated; the freight-cars, when loaded, should have barred doors to permit the free entrance of air at all times, whether moving on the track or placed upon the sidings; and passenger and sleeping cars should be provided with automatic ventilators, so as to secure a rapid change of air in the cars at all times.

Proposition III.—Concerning Mails and Mail-matter by Rail: Mail-matter and mail-bags shall be heated to a temperature of 250 degrees Fahrenheit, or be otherwise disinfected before they are sent from infected places by railway trains.

Proposition IV.—Concerning Notification of Yellow Fever: Whenever any case of yellow fever, or sickness suspected to be yellow fever, shall be found in New Orleans, or in any of the Gulf ports, the President of the State Board of Health of Louisiana, or the president of the board of health of such Gulf port, shall at once notify all the members of this SANITARY COUNCIL by letter, giving the date and lo-

calities of such sickness. If the disease becomes epidemic, or spreads to such a degree as threatens to become epidemic, full information on all these points shall be given to the members of this Council by the State Board of Health of Louisiana, or president of the board of health of any Gulf port.

The Sanitary Council aimed to secure for railroad travel and traffic some of the good results which Dr. Vanderpoel had secured in maritime quarantine by lighterage of freight and re-shipment of passengers, the infected vessels never being permitted to enter port. A system was thus adopted for railroad travel, by which the passenger train should never enter an infected district, but a transfer must take place at some point not less than 50 miles nor more than 75 miles from an infected city, of all passengers and their disinfected baggage, no passenger with fever being permitted to proceed on this train. The passenger and baggage cars are thus kept out of the infected district. Way-freight must be transferred after leaving the infected district, but through-freight in cars ventilated by a current of air passing through the whole length of the car during transit need not be transferred, the disinfecting influence of pure air, long applied, being deemed sufficient.

There was a good deal of discussion in regard to the method of disinfecting the baggage of passengers. It is desirable to have some substance which can be very rapidly applied, and which will leave no after-effects, even on the most delicate clothing, in the way of deposits, change of color, persistent odor, etc. All the ordinary disinfectants fail in one way or another of these desirable results. I ventured to call the attention of the Council and members of the National Board of Health to bisulphide of carbon as a disinfectant. It is an energetic germicide, can be cheaply prepared, is very volatile, so that two or three ounces dashed into a trunk full of clothing will penetrate by its vapor every part of the trunk when closed, but in a few hours, or even minutes, when freely exposed to air, will entirely evaporate, leaving no odor or mark of any kind, and will not injure the most delicate fabrics.

SANITARY MATTERS IN SECTION ON STATE MEDICINE AND PUBLIC HYGIENE.

I have devoted so much space to the transactions of the Sanitary Council and the National Board of Health that I have little space to speak of the doings and papers in the American Medical Association and its sections. Sanitary matters had a prominence in the papers and discussions of this large body of learned men never before witnessed, and if I should attempt an adequate synopsis of all that was said and written, my report would assume the proportions of a volume rather than a paper. The meetings of the section on State Medicine and Public Hygiene were crowded, and at the first meeting not more than one-half were able to get inside the small room assigned for its use.

I shall not attempt a synopsis of the papers because many of them were so important, and though long, were full of such condensed truth that a synopsis is impossible, such, for example, as the address of Dr. Billings, chairman of the section, and of Dr. Johnson, of Chicago, on the "Regulation of Medical Practice by State Boards of Health." The paper of Dr. Chaillé, of New Orleans, on "State Medical Societies and State Medicine," was considered of sufficient importance to be read in the general session of the Medical Association. The paper by Dr. Storer on Protective Sanitation has been published in the Sanitarian.

The Sanitary Council and the National Board of Health will hold a meeting in Nashville, Tenn., commencing Nov. 18th, and I trust this Board will send a delegate to attend that meeting.

CULTURAL COLLEGE, July 5, 1879.

REGULATION OF THE PRACTICE OF MEDICINE.

A REPORT

—BY—

HON. LEROY PARKER

OF FLINT, MICHIGAN,

MEMBER OF THE

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON LEGISLATION IN THE INTERESTS OF PUBLIC HEALTH.

REPORT ON THE SUBJECT OF THE REGULATION OF THE PRACTICE OF MEDICINE.

To the President and Members of the State Board of Health:

At the October meeting of this Board, the following resolution was adopted:

"*Resolved,* That the Committee on Legislation be requested at once to make inquiries relative to the recent act in the Illinois Legislature 'Regulating medical practice,' and to its practical working, and report to this Board whether, in its opinion, a similar act in our own State is desirable."

In accordance with the request contained in the above resolution, your committee obtained from Dr. J. H. Rauch, President of the Illinois State Board of Health, a copy of the act of the Legislature of Illinois, known as "The Medical Practice Act," together with some documents bearing upon the subject.

The act in question was passed May 29, 1877, and went into effect July 1, 1877. It has thus been in operation about a year and a half. I have been able to obtain but little information as to the practical working of the law. Dr. Rauch, in his letter accompanying the copy of the act sent me, says, regarding the operation of the law: "More has been accomplished than we had a right to expect. If I ever had any doubts with regard to the necessity for such a law, they have long since been dispelled. The execution of such a law is not pleasant, especially in the outset. * * So far about 1300 have left the State or quit practice, and about 100 have been prevented coming into the State or commencing practice."

In the case of Nathan J. Aikin *vs.* the State Board of Health, the complainant applied to the judge of the Cook county circuit court at the last October term, for an injunction to restrain the State Board of Health of Illinois from revoking his license as a physician, which they had threatened to do, by virtue of the power vested in them under the Medical Practice Act, on the ground that he was guilty of conduct unprofessional in a physician. The judge of that circuit, Judge E. S. Williams, in the course of his decision refusing the injunction, uses the following language in commenting upon the law under which the Board were acting when they undertook to revoke the license of the complainant: "In a certain sense, it is true that every man has a natural right to follow out the bent of his inclination and be a clergyman, a lawyer, a doctor, a scavenger, a peddler, an auctioneer, just as he may choose. But it is not true that a man can practice any one of these professions, or occupations, except he does it upon such terms as the law imposes; and the law can impose just such terms upon any one of these professions or employments as the legislators, in their discretion, deem most for the interests

of the community. The law has always sought to fill the learned professions with learned men, and upright and honorable men. However sadly it may have failed, the attempt has been in the right direction. It therefore has hedged round the professions of law and medicine with licenses, as it has hedged in many other businesses in the same way. Men who have the property and lives of others especially intrusted to their keeping, ought to be men of skill and learning in their several departments. More than that, it is of the [illegible] that all shown and dishonesty should be expelled from [illegible] professions, and the tendency of legislation has always been to [illegible] a natural right to be a lawyer or a [illegible] which the law may [illegible] his entrance upon [illegible] upright [illegible] make it [illegible]

Representatives. Whether a bill designed to effect the same purpose, if brought before the present legislature, would secure a sufficiently large vote to insure its passage, is, of course, merely conjectural. The fact that similar bills have failed in former legislatures is, perhaps, no reason why the same measures might not receive the support of the legislature now in session, and it certainly affords no ground for the presumption that such a law would not be productive of the highest good to the people of the State.*

Your committee is of the opinion that a law similar in its effect to that in force in the State of Illinois would be desirable in this State. Such a law as would afford a guarantee to the public that the person offering his services as a physician was qualified to perform the duties of his profession, either by a course of instruction in a reputable medical institution, of which a diploma should be the evidence, or by undergoing an examination before a competent corps of examiners, or by reason of a certain number of years' practice, would, I believe, not only be well received by the people of this State, but would afford them immunity from a class of ignorant practitioners who must certainly do far more harm than good. I have been unable to form an opinion as to whether the State Board of Health should be the body authorized to issue certificates to persons proving their qualifications to practice medicine, as is the case in Illinois. It certainly would devolve a large amount of work upon this Board, of conducting examinations, and examining and verifying diplomas, which the members might feel a decided reluctance to assume, unless the law should make some provision for compensating the board of examiners for their services. This might be done by fees collected from the persons examined and those to whom certificates are given. The bills which have been introduced at previous sessions of the legislature provided for the selection of a board of censors whose duty it should be to pass upon the qualifications of persons desirous of practicing medicine. It may be doubted whether any method of selection of these censors would be free from objections which the jealousy of particular factions might raise; and for this reason, it would perhaps be better if the State Board of Health were the duly authorized body to act as examiners, and to issue all certificates. The selection of the members of this Board by the Governor is far removed from the influence of any particular school of medicine, and their action would be as unbiased and free from any suspicion of favoritism as that of any other board which could be chosen. It is more

* A bill to regulate the practice of medicine passed both branches of the Michigan Legislature, after the above report was made, and near the close of the session of 1879, but failed to receive the signature of the Governor, owing to some informality in its passage. The bill provided for three boards of examiners, to be appointed by the Governor biennially, representing different factions, or "systems of practice;" examinations were not to be confined to the medical sciences, except for candidates belonging to factions not represented by an examining board, but were to be "of an elementary and practical character, but sufficiently strict to test the qualifications of the candidate as a practitioner;" diplomas from colleges of the different sects in medicine were to be accepted in lieu of examinations; certificates were to be granted to those possessed of diplomas, or found properly qualified, but not to any person whom, upon examination, they should find to be addicted to the habitual use of alcoholic drinks; and in case a certificate had been issued it was to be revoked if, on examination, the holder thereof should be found guilty of habitually using alcoholic drinks as a beverage; the certificates were to be recorded in the office of the clerk of the county where the holder resided, and the record was to be kept open for public inspection; the practice of any branch of medicine or surgery by any person not possessed of the certificate of one of the examining boards was declared a misdemeanor, punishable by a fine of not less than twenty-five nor more than one hundred dollars, or by three months' imprisonment in the county jail, or by both fine and imprisonment; and in no case was such unlicensed practitioner to have a legal claim for services rendered.

than probable, however, that the usefulness of the State Board of Health in the field of work in which it is now engaged would be seriously impaired if, in addition to its present duties, it should be obliged to conduct examinations of candidates for the degree of Doctor of Medicine. This would involve new and difficult labors and would inevitably, however impartial its action might be, bring the Board into conflict with some one or other of the various schools of medicine.

The subject of examinations in Sanitary Science to be conducted by the State Board of Health was introduced at the last meeting of the Board by Dr. Lyster, and the matter was referred to Dr. Lyster and myself to report upon. I have in that report simply given my views as to the power of this Board, under the existing law, to hold examinations, which will be purely voluntary for the candidates presenting themselves. Should a law regulating medical practice, similar to that of Illinois, be proposed, and this Board constituted the examining body, the object sought to be attained in the resolution offered by Dr. Lyster will be reached if the proposed measure should become a law, with this addition: that the examinations will be compulsory upon those seeking admission to the medical profession, and will also include an examination of the qualifications of candidates, for the practice of medicine. The plan proposed by Dr. Lyster provides for an examination of those candidates who choose to present themselves to the Board, upon questions relating solely to sanitary science and public health. Upon these questions the members of the State Board of Health should be qualified to conduct an examination, though they might not be qualified to make an examination in the medical sciences; because much of the practical work in sanitation may be done by persons who have given especial study to this subject, but who are not experts in physiology, chemistry, anatomy, pathology, or therapeutics,—sciences which should be mastered by every one who practices medicine or who examines those who propose to practice medicine.

METHODS

OF

HEATING AND VENTILATING

PRIVATE DWELLINGS AND PUBLIC BUILDINGS

ALREADY CONSTRUCTED.

A REPORT

—BY—

Rev. DANIEL C. JACOKES, D. D.,

OF PONTIAC, MICHIGAN,

MEMBER OF THE

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON BUILDINGS, PUBLIC AND PRIVATE, INCLUDING VENTILATION, HEATING, ETC.

HEATING AND VENTILATION

OF PRIVATE DWELLINGS AND PUBLIC BUILDINGS ALREADY CONSTRUCTED.

To secure the greatest convenience, health, and economy, in heating and ventilating our private homes, and our churches, schools, and other public buildings already constructed, is the object of the following paper. To accomplish this purpose, two things are to be done,—

1. The *warming* of buildings, with efficiency and economy.
2. The *ventilation* of buildings so as to secure PURE air for the use of the occupants.

The supply of *pure* air for breathing purposes is of more importance to secure health than the amount of warmth, as breathing impure air is certainly known to be the cause of a large majority of diseases which afflict communities. It prepares the system for every contagious disease to which it may be exposed, and originates many other diseases which we suffer.

It is not the design of this writing to fully discuss the results of breathing impure air or living in ill-warmed rooms, but to call the attention of thoughtful persons to this subject in such manner as to show more clearly the importance of properly warming and ventilating our homes, and to illustrate the manner of accomplishing this desirable object. It may be proper to inquire in the first place, what *constitutes pure air?*

1. Pure air is composed of 79 parts of nitrogen and 21 parts of oxygen; there are also about 4 parts in 10,000 of carbonic acid. Air containing more than 6 parts in 10,000 of carbonic acid is considered impure and injurious.

Nitrogen is a transparent gas without color or taste, noted for its chemical inertness, and is combined with other substances by indirect means. It does not support combustion or respiration; it will immediately extinguish a flame, and animals breathing it will die. In the atmosphere it dilutes the other gases by diffusion. It is a law that gases will intimately mix with each other irrespective of their specific gravities; nitrogen thus minutely divides the oxygen, so as to secure to us its greatest benefit in respiration.

Oxygen is a colorless, tasteless, inodorous gas, a universal supporter of respiration, and is essential to combustion; without it all animals would die.

Carbonic acid when inhaled is a *poison,* and destroys life; out-door air contains about four cubic feet of this gas in ten thousand; this is so diffused that it cannot do harm to the health of those who breathe it; if more than

six parts in ten thousand, the air is impure, and it would be unhealthy to breathe it. With pure air in our habitations and public buildings, we should be protected from most diseases which now destroy the health and lives of so many of our fellow men.

2. We inquire into the composition of *impure* air.

The impurities in the air is commonly represented by carbonic acid exhaled from the lungs; there are other impurities produced by respiration, perspiration, combustion of oils, gases, organic matter, excess of water, exhalations from the sick, decaying matter, emanations from sewers, house drains, cesspools, damp cellars. These, with more or less of the constantly increasing amount of carbonic acid, which, in many instances in our dwellings, schools, and churches, amounts to from thirty to seventy parts in ten thousand of air, added to this the continual *decrease* of oxygen, will invariably produce dangerous and often fatal results. Those who are exposed to this poisoned air are never in good health, and are subject to heaviness, headache, furred tongue, quickened pulse, febrile symptoms, thirst, loss of appetite, catarrh, bronchitis, consumption, typhus or typhoid fevers, diphtheria, scarlet fever, croup in children, and are prepared for any contagious disease to which they may be exposed, and their lives are invariably shortened. These are mostly *preventable* diseases. Such results should teach us the responsibility of securing, at any cost within our reach, pure air in our homes and public buildings. The possibilities of a vigorous healthy life, who can estimate? Yet health and life, with its possibilities, are endangered, if not quickly sacrificed in the foul air of our homes. Pure air would save millions of money and diminish human suffering to a minimum.

The amount of fresh air necessary to keep pure the atmosphere of occupied rooms will be about two thousand cubic feet per hour for each person. The practical question now is, how shall this amount of pure, fresh, warm air be procured in our homes or public buildings already constructed,—1. During summer; 2. During the time when artificial heat is used for warming them?

I.—DURING SUMMER.

The great difficulty in summer is to distribute the fresh air equally through the room so as to avoid producing currents of air, which is injurious to persons who are at rest, as standing, sitting, or sleeping. This may, in whole or in part, be done by opening the windows or doors, on the opposite side of the house from which the wind comes, also by lowering the upper sash of the window, having a curtain before it; or better, perhaps, by raising the lower sash about four inches and placing a board under the sash so as to fill up the space entire. This will give an opening between the two sashes where they meet which will admit the out-door air without producing an improper or sensible current across the room. This method may be used day or night, whatever be the temperature or season.

II.—DURING THE TIME WHEN ARTIFICIAL HEAT IS USED.

During cold weather ventilation shoud be produced by the aid of heat. The following rules should be carefully observed in heating and ventilation:

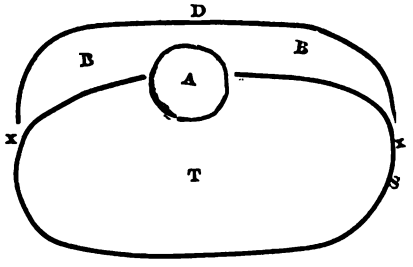
1. Conduct, in some convenient manner, *out-door* air against a *heated surface.*

2. Conduct the *in-door* air from the *floor* into a *heated flue.* In this manner a complete circulation of air may be had, and an abundant supply of pure,

warm air may be secured; provided, first, that the ducts be sufficiently large; and, second, that the dust in the air be not *burned* by a *red-hot* surface. If these rules are observed the heating and ventilation will be very economical and satisfactory. Most of the buildings, public and private, for human use, are constructed without any reference to ventilation; indeed, most of them seem to have been planned to prevent the possibility of either the light of the sun or the pure air of heaven to enter them. There is consequently much difficulty in properly heating or ventilating them. Those who prefer health to the sight of the changes necessary in each case to secure such an end, must not object to see an additional pipe to convey foul air out of the room, and also a pipe to convey the pure, out-door air into it.

There are many buildings heated by a furnace. In these the pure out-door air is properly heated; but where there is no preparation for ventilation, this may be secured in the same manner as when heated by a stove. The great majority of houses are heated by stoves. The out-door air in such cases must be conducted to the surface of the stove, as illustrated by the following diagrams. These stoves have various shapes; whatever that may be, the principles will here be explained so that any person may modify the method so as to secure the result desired. Figure 1 will show how a sheet-iron jacket may be fitted to the back of a stove for heating the out-door air brought within the jacket against the stove. The jacket is seen at the top of the stove, and is represented by the line marked D. See figure 1.

FIG. 1.

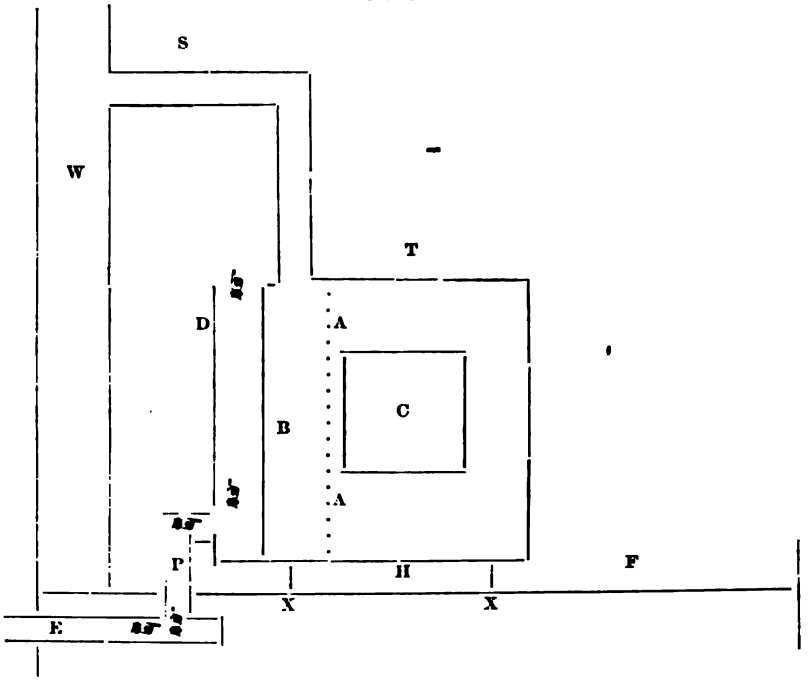


T represents the top of the stove.
S, the stove door.
A, hole for stove pipe.
B B, open space at the top of the stove for the warmed air to escape into the room.
D, the line showing the sheet-iron jacket fitted to the sides of the stove at x, x, to bring the out-door air to the heated surface of the stove.

The jacket should never be more than *four and one-half* inches from the back of the stove, and should *always* be *closed* at the *bottom*, so that the air in the room will never be reheated and breathed over again and again. This should be remembered whatever kind or form of jacket is used.

Figure 2 (page 56) illustrates the manner of conducting the out-door air to the stove within the jacket for heating.

FIG. 2.



T, top of the stove.
C, stove door.
B, back of the stove.
F, floor.
S, stove-pipe.
W, chimney.
D, sheet-iron jacket, seen in section.
H, bottom of the stove.
A A, the edge of the sheet-iron jacket fitted to the sides of the stove and made fast.

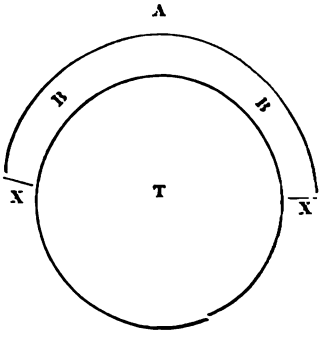
P, supply-pipe connected with the jacket D and box-pipe E which conducts the out-door air against the back of the stove B within the jacket D.

E, wooden box-pipe, 6x12 inches inside, to conduct out-door air to supply-pipe P.

The hands show the direction of the current of air from out door into the room.

X, X, stove feet.

FIG. 3.



T, top of the stove.

A, sheet-iron jacket surrounding the back of the stove, and the fitting of its edges, x, x, to the sides of the stove.

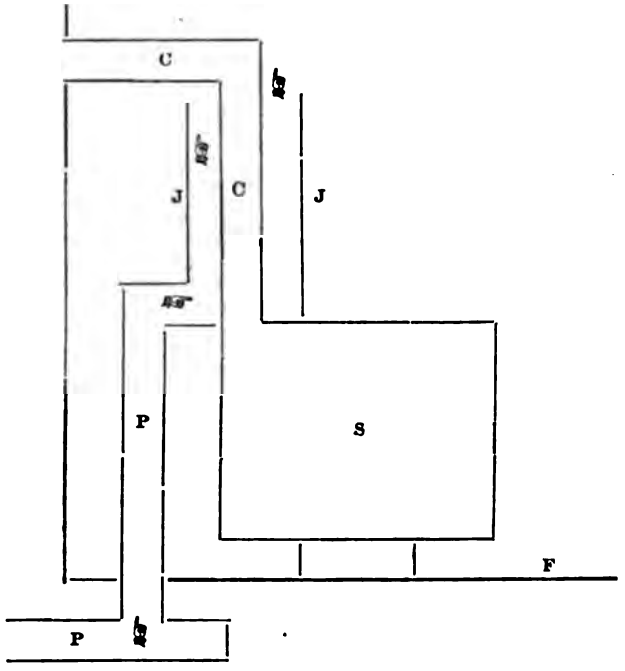
X, X, edges of the jacket fitted to the sides of the stove.

B B, the space between the jacket and the back of the stove for heating the air and its escape into the room. The out-door air is conducted within the jacket the same as with the wood stove.

The coal stove may be jacketed in the same manner as the wood stove. In this case the jacket may be fitted to the sides of the stove very nicely, covering the back of the stove in the same manner as the wood stove, so that the sheet-iron jacket will be at an average distance of four and one-half inches from the back, never more than this. Figure 3, page 56, will explain the manner of doing this.

Out-door air may also be heated by conducting it within a jacket around the stove-pipe of a wood or coal stove, as shown, in section, in Figure 4.

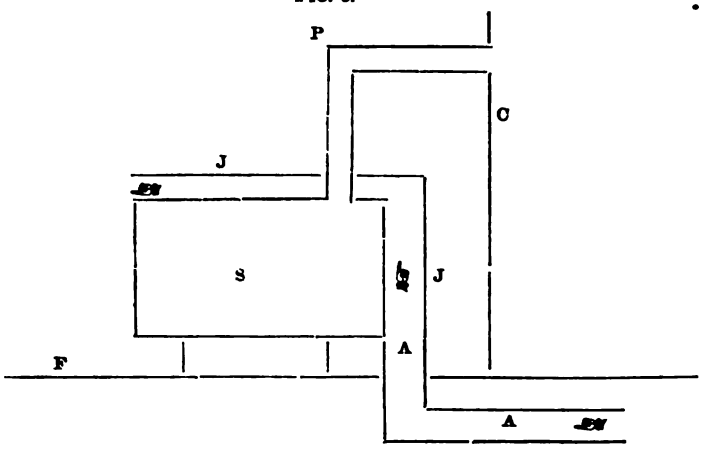
FIG. 4.



S, stove.
CC, stove-pipe.
JJ, sheet-iron jacket around the stove-pipe.
PP, supply-pipe for conducting out-door air within the jacket for heating, seen in section. The jacket, JJ, should not be less than twelve inches in diameter.

In school-houses, where box stoves are mostly used, a sheet-iron jacket may enclose the stove excepting the front, which should be left open for the escape of the heated air. The space between the stove and jacket should be four inches, not more, on the sides and top; on the back the jacket may be as wide as the hole in the floor, six inches. An opening should be made through the floor at the back end of the stove near the jacket, six inches by sixteen, if the jacket is wide enough to cover it. A pipe the shape of the hole should be fitted so as to reach a little above the bottom of the stove, that the air may reach the heated surface at once. Figure 5 (page 58), seen in section, shows this.

FIG. 5.



S, stove.
F, floor.
JJ, jacket around the stove except in front.
P, stove-pipe.
C, chimney.
AA, supply-pipe for conducting out-door air within the jacket JJ.
The marks show the direction of the out-door air into the room.

VENTILATION OF HOUSES ALREADY CONSTRUCTED.

Ventilation, according to rule second, should always convey the in-door air from the floor into a heated flue. If the chimney is properly constructed this may be done with little expense or trouble; usually, however, this is not the case. The general rule is to build chimneys very small, mostly four inches by twelve or sixteen on the inside. This narrow space will soon be more or less filled with soot. In such cases ventilation will be difficult, if not impossible. If the chimney has been constructed with an apartment for ventilation, it will be sufficient to make an opening into it at the floor,—that is, the bottom of the opening must in all cases be exactly even with the top of the floor, otherwise the ventilation will be imperfect; this will give good ventilation. All chimneys should be constructed with an apartment for each story, as shown in Figure 6, and should be plastered smooth; the partition should be made of brick and built in edgewise, so that it will be two inches thick; this wall will be constantly heated to keep a continual draft in the ventilating flue.

FIG. 6.

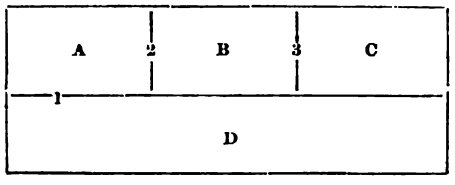
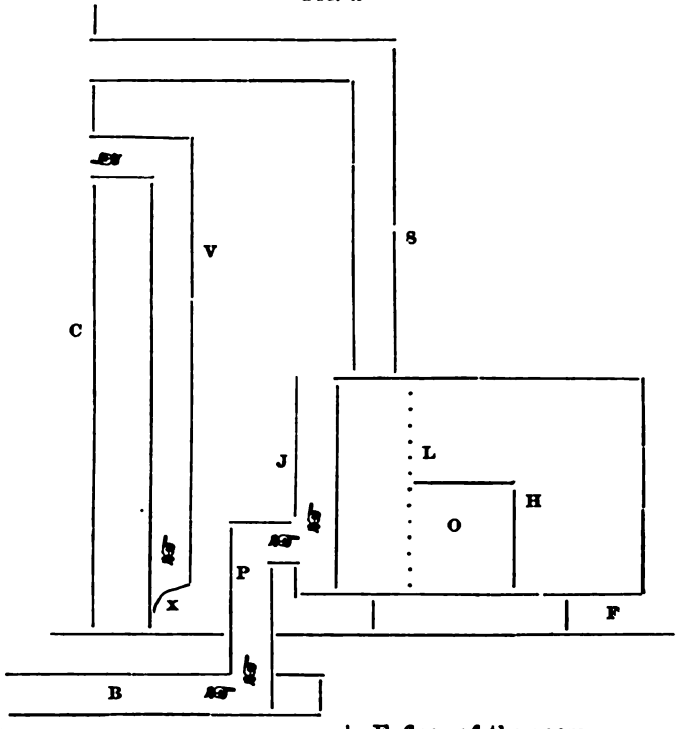


Figure 6.—A, ventilating flue for the cellar, the air being taken from the bottom of cellar and conveyed into flue A.
B, ventilating flue for the first story;
C, for the second story.
D, the smoke flue.
1, 2, 3, the partition walls two inches thick, made by placing the bricks edgewise, and plastered.

If a chimney is sufficiently large, a seven or eight inch stove-pipe, or larger if possible, may be let down inside of the chimney and turned into the room at the floor by an elbow; this will make an efficient ventilator. If there is

not sufficient room, or if for any other cause, as a crooked chimney, this cannot be done, ventilation may be effected, as illustrated in Figure 7. Take a pipe 1 inch smaller in diameter than the supply-pipe which is to conduct the out-door air to the stove, and carry it into the chimney if possible *below* the entrance of the smoke-pipe. This plan can be adopted more frequently and at less cost than any other, as chimneys are generally constructed.

FIG. 7.

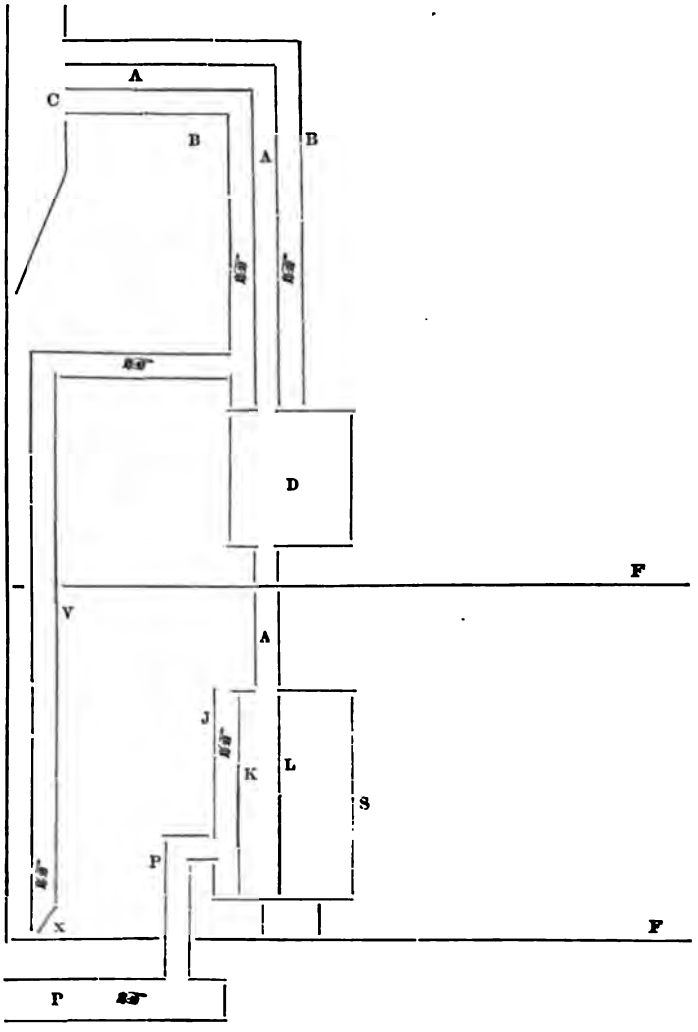


H, stove.
S, stove-pipe.
JL, sheet-iron jacket.
P, supply-pipe, say seven inches in diameter.
B, box for supplying out-door air to supply-pipe P.
V, ventilator, say six inches in diameter, taking foul air from the floor into the chimney C, below the smoke-pipe S.
F, floor of the room.
X, an opening into the ventilating pipe to admit the foul air.
O, stove door.
L, edge of sheet-iron jacket where it joins the side of the stove.
The marks ☞ ☞ show the direction of air. The bottom of the sheet-iron jacket should always be closed, as shown in diagram.

In many houses the chimney is so constructed, or situated, that the ventilation would not be equal to the work required. Such an instance would be when the chimney is short, the bottom being near the ceiling in the upper story, with a stove in each story connected with it. In such cases ventilation would be hardly possible. To remedy this, the following plan may be adopted: The stove-pipe in the second story may be surrounded by a much larger pipe. A six-inch pipe may be surrounded by a ten-inch pipe; a seven-inch, by a twelve-inch jacket-pipe, and the ventilator may be connected with this surrounding jacket. The stove-pipe and the jacket are both to be carried into the chimney as one pipe; the stove-pipe within will so heat the surrounding air

that a strong ventilation will be the result. The ventilator should enter the jacket at or near its bottom, as seen in Figure 8.

FIG. 8.



S, stove.
JL, sheet-iron jacket for heating the air.
L, the sheet-iron jacket joined and fastened to the sides of the stove.
PP, supply-pipes to convey the air for heating within the jacket JL.
D, drum-stove in second story.
AAA, stove-pipe.
BB, sheet-iron jacket around the stove-pipe, A, for ventilation.
F, F, floors.
V, ventilating-pipe to convey the foul air from the room-floor into the jacket, BB, to be heated by the stove-pipe, AA, and carried into the chimney, C.
X, an opening in the ventilating-pipe at the bottom to take away the foul air.
K, back of the stove inside the jacket.
The ☞ ☞ show the course of the air in the ventilating-pipes.

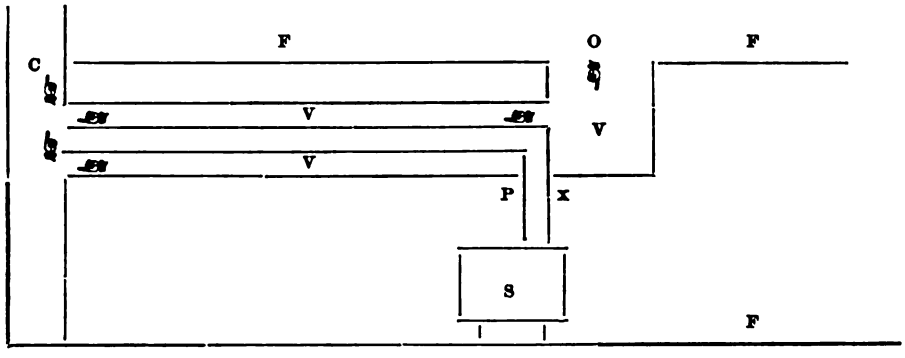
This plan, as well as the others recommended, will secure good heating and ventilation, at a very moderate cost. I have known it to cost from ten shil-

lings in the simpler forms, to ten dollars by the more complicated forms; so that healthy and comfortable homes may be enjoyed by the poor as well as by the more favored of our fellow citizens.

The ventilation of churches, schools, and other public buildings, where large numbers of persons assemble, is of the highest importance. The general practice is to construct very small chimneys, which renders it difficult to secure efficient ventilation. In all these cases, it would be better to reconstruct them, making them say sixteen by thirty-six inches inside, dividing the space into two or more apartments, if there is one story to be warmed,—or into three if two stories,—one for the smoke, the others for ventilation, with an opening into each ventilating flue, always at the floor. One church has a chimney sixteen by thirty-six inches inside, divided by putting a sixteen-inch pipe of heavy sheet-iron so as to make the side flues of equal size; the pipe is fitted close to the brick wall to secure it to its place. This is the smoke-pipe, and it warms the air almost instantly in the foul-air flues at its sides, making a very powerful ventilator. This church has a basement story and needs two flues, one for each room. If this pipe should ever be destroyed, another can be slipped inside of it, and thus renewed. In public buildings which are heated at intervals this sheet-iron pipe is the best, as it heats the air on each side at once. In a building constantly heated the best way would be to build the partitions in the chimney with brick. The flues should always be plastered smooth. When this cannot be done the ventilation must be made in the same manner as for dwelling houses, the ventilating-pipes being correspondingly large.

In another church, a jacket-pipe sixteen inches in diameter was put around a stove-pipe seven inches in diameter, connected with a stove all in the room below, and carried into the chimney. The end of the jacket opposite to the chimney was turned up through the floor by an elbow to receive the foul air of the room above, and discharge it into the chimney. The seven-inch pipe enters the sixteen-inch pipe about four feet from the end farthest from the chimney, and passes through it to the chimney. A fire in the stove below will warm the foul air in the large pipe and thus carry it away into the chimney. This fire must be made as soon as that made in the furnace or other heating apparatus, and continued as long. This church is finely heated and ventilated. See Figure 9.

FIG. 9.



F, F, floors.

S, stove in the basement.

P, stove-pipe which enters the large ventilating-pipe V at X, and continues through its center till it reaches the chimney.

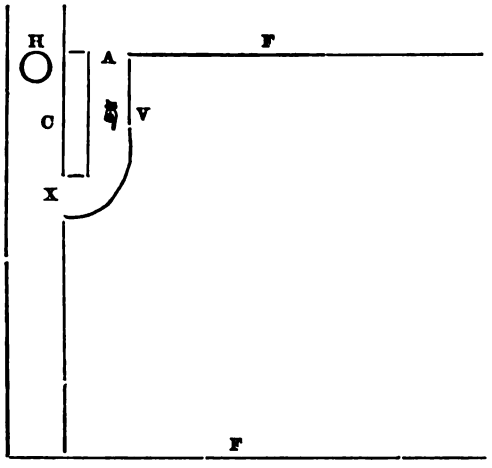
VV, ventilating-pipe which surrounds the stove-pipe P and enters the chimney and there discharges the foul air from the room above.

O, an opening through the floor of the upper room, through which the foul air of the room above passes into the ventilator and through it to the chimney.

C, chimney.

Another church, which is heated by a furnace, is ventilated in the following manner: It has a chimney sixteen by thirty-six inches inside; to secure good ventilation, a hole is made through the floor near the chimney sixteen by twenty inches inside; a wooden tube is fitted into this and reaches down into the room below, near an opening made into the chimney. A sheet-iron elbow connects the wooden tube with the chimney; the foul air from the room above passes through this tube into the chimney below, and this ventilates the church, giving it pure, warm air. The opening into the chimney is made below the entrance of the smoke-pipe from the furnace, so that the smoke does not enter the ventilating tube. See Figure 10.

FIG. 10.



F, F, floors.
C, chimney.
H, furnace smoke-pipe entrance, above the entrance of the ventilator at X.
X, the opening into the chimney for the ventilator.
V, ventilator connected with the opening in the floor above at A, and the chimney below at X.
A, the opening through which the air passes from the room above into the chimney below.
This church is easily heated and ventilated.

In all these illustrations the two rules given have been observed, and may be applied in many other forms: first, Conduct the out-door air against a heated surface; second, Conduct the foul air in the room from the floor into a heated flue, and good heating and ventilating will be secured.

REPORT

—ON—

SLAUGHTER-HOUSES, RENDERING-ESTABLISHMENTS, ETC.

—BY—

HOMER O. HITCHCOCK, M. D.,

OF KALAMAZOO,

MEMBER OF THE

STATE BOARD OF HEALTH.

REPORT ON SLAUGHTER-HOUSES, RENDERING-ESTABLISHMENTS, ETC.

BY HOMER O. HITCHCOCK, M. D.

At the April meeting of this Board the following communication, addressed to Dr. Kedzie, the President, was presented and referred to the Committee on disposal of excreta and decomposing organic matter:

"DOWAGIAC, March 31, 1879.

"*Prof. R. C. Kedzie:*

"DEAR SIR:—I have a small matter before me in which I want some advice. There is situated near where I live a slaughter-house, which has been and is now a nuisance which is most intolerable to live by. The stench therefrom was so bad that it caused most everything that we had in our cellar, such as milk and other edibles, to taste. I have been to the parties at different times and told them that it would be impossible for us to live with that as it was. They told me they would clean up the yard. They did not even do that. I then applied to and made my complaint to the township board, and they have done nothing about the matter. I have been advised to write to you, having been informed that you were the President of the State Board of Health. I should have told you that we were all of us sick last Fall, and the physician told us that we could not live here and have our health. I should also have stated that the slaughter-house is near the public highway, on Dowagiac creek, and that the people traveling the road also complain of the stench from the slaughter-house and the yards.

"I would like to know if these parties can still keep their nuisance and endanger the health of my family and the neighborhood and nothing be done about the matter. I wish that you might point me out the way in which I might proceed to have the nuisance removed, and oblige,

Yours with respect,

FRANK ANDRUS.

"P. S.—Will you please answer and give advice?

F. ANDRUS."

As this complaint is only one of hundreds that may arise, it has been thought by the committee to whom it was referred that a paper should be prepared upon the relations of the slaughtering and allied business to the public health,

calling especial attention to the present laws of the State concerning them, and the real relation of the State Board of Health and local boards of health to them.

The State Board of Health is not *judicial* nor *executive*, but only investigating and *advisory*, in its functions. On reading the act by which the State Board of Health was created, it is apparent that it has not been endowed with judicial authority, nor with any executive power, through the exercise of which it can directly abate nuisances. Its duties, as specified in section 2, act No. 81, laws of 1873, are as follows, viz.: "The State Board of Health shall have the general supervision of the interests of the health and life of the citizens of this State. They shall especially study the vital statistics of this State, and endeavor to make intelligent and profitable use of the collected records of deaths and of sickness among the people; they shall make sanitary investigations and inquiries respecting the causes of disease, and especially of epidemics; the causes of mortality, and the effects of localities, employments, conditions, ingesta, habits, and circumstances on the health of the people. They shall, when required, or when they deem it best, advise officers of the government, or other State boards in regard to the location, drainage, water-supply, disposal of excreta, heating and ventilation of any public institution or building. They shall, from time to time, recommend standard works on the subject of hygiene for the use of the schools of the State." In section 5, among other duties assigned to the Secretary of the Board, he is required to "collect information concerning vital statistics, knowledge respecting diseases, and all useful information on the subject of hygiene, and through an annual report, and otherwise, as the Board may direct, shall disseminate such information among the people."

In Local Boards of Health, and in them alone, except when questions are referred to the courts, has been confided the authority to act in the abatement of nuisances.

The following are some of the existing laws relative to the matters in question:

Who constitute the board of health in every township, village, or city?

This may be answered by the following sections of law:—

Board of health.

(1692.) *SECTION 1. In every township the township board shall be the board of health. The supervisor shall be the president, and the township clerk shall be the clerk of said board. The clerk shall keep a record of the proceedings of the board in a book to be provided for that purpose at the expense of the township.†—(*37.)

Appointment of health officer, his compensation, etc.

(1693.) SEC. 2. Every township board of health shall appoint and constantly have a health officer of the township, who shall, where practicable, be a physician and sanitary adviser, and an executive officer of the board: *Provided*, That in townships where it is not practicable to secure the services of a well educated and suitable physician, the board may appoint the supervisor or some other person as such health officer. The board of health shall establish his salary or other compensation, and shall regulate and audit all fees and charges of persons employed by them in the execution of the health laws and of their own regulations. Within thirty days after the annual township meeting in each year, the board of health shall meet for the transaction of business and shall appoint or reappoint a health officer, and shall immediately cause to be transmitted to the Secretary of the State Board of Health, at Lansing, the full name and postoffice address of such health officer, and a state-

*Numbers in parentheses at beginning of paragraphs refer to sections of the compiled laws of 1871; those at the end of paragraphs refer to sections of compilation of public health laws, 1876.

ment whether he is a physician, the supervisor, or some other person not a physician. A special meeting of the board may be called by the order of the president or of any two members of said board.*—(38.)

Board of health in cities and villages, who to constitute.

(1740.) SEC. 49. The mayor and aldermen of each incorporated city, and the president and council, or trustees of each incorporated village in this State, in which no board of health is organized under its charter, shall have and exercise all the powers, and perform all the duties of a board of health as provided in this chapter, within the limits of the cities or villages, respectively, of which they are such officers. The provisions of this chapter, and the amendments thereto, shall, as far as applicable, apply to all cities and villages in this State, and all duties which are, by the provisions of this chapter, to be performed by the board of health of townships, or by the officers and inhabitants thereof, shall in like manner be performed by the board of health and the officers and inhabitants of such cities and villages, with a like penalty for the non-performance of such duties, excepting in cases where the charters of such cities and villages contain provisions inconsistent herewith.†—(85.)

What duties does the law impose on, and require of, these local boards of health in respect to the various trades referred to in this paper?

This question may be answered by the following sections of law:—

Regulations relating to causes of sickness, etc.

(1694.) SEC. 3. The board of health shall make such regulations respecting nuisances, sources of filth, and causes of sickness, within their respective townships, and on board of any vessels in their ports or harbors, as they shall judge necessary for the public health and safety; and if any person shall violate any such regulations, he shall forfeit a sum not exceeding one hundred dollars.—(39.)

Board to examine into nuisances, etc., and destroy, remove, or prevent the same.

(1699.) SEC. 8. The board of health shall examine into all nuisances, sources of filth, and causes of sickness that may, in their opinion, be injurious to the health of the inhabitants within their township, or in any vessel within any harbor or port of such township; and the same shall destroy, remove, or prevent, as the case may require.—(44.)

Proceedings, if nuisance, etc., found on private property.

(1700.) SEC. 9. Whenever any such nuisance, source of filth, or cause of sickness shall be found on private property, the board of health shall order the owner or occupant thereof, at his own expense, to remove the same within twenty-four hours; and if the owner or occupant shall neglect so to do, he shall forfet a sum not exceeding one hundred dollars.—(45.)

When nuisance, etc., to be removed by board at expense of owner, etc.

(1701.) SEC. 10. If the owner or occupant shall not comply with such order of the board of health, such board may cause the said nuisance, source of filth, or cause of sickness, to be removed, and all expenses incurred thereby shall be paid by the said owner or occupant or by such other person as shall have caused or permitted the same.—(46.)

Places may be assigned for carrying on offensive trades.

(1737.) SEC. 46.‡ The township board of every township, the president and trustees, or council, of every village, and the mayor and aldermen of every city, respectively, when they shall judge it necessary, shall, from time to time, assign certain places for the exercising of any trade or employment offensive to the inhabitants or dangerous to the public health; and they shall forbid the exercise thereof in places not so assigned; and all such assignments shall be entered in the records of the township, village, or city, and they may be revoked when the said township, village, or city officers may think proper.—(82.)

Attention is also called to the following sanitary provisions relating to cities and villages:—

Powers and authority, and exercise thereof.

(§) SECTION 1. Every city incorporated under the provisions of this act,¶ shall, in addition to such other powers as are herein conferred, have the general powers and authority in this chapter mentioned; and

* As amended by act No. 56, laws of 1877.
† As amended by act No. 145, laws of 1879.
‡ See also sections 50 and 51, added by the Legislature in 1879, and which are given on page — of this volume.
§ Laws of 1873,—Act No. 178, Chap. XL—pages 296, 298, 299.
¶ Act No. 178, Laws of Michigan, 1873.

the council may pass such ordinances in relation thereto, and for the exercise of the same, as they may deem proper, viz.:

* * * * * * * * * * * *

To abate nuisances.

Third, To prevent injury or annoyance from anything dangerous, offensive, or unhealthy; to prohibit and remove anything tending to cause or promote disease; to prevent and abate nuisances, and to punish those occasioning them, or neglecting or refusing to abate, discontinue, or remove the same; and generally to determine and declare what shall be deemed nuisances;

* * * * * * * * * * * *

Inspection of certain provisions.

Eighteenth, To provide for and regulate the inspection of meats, poultry, fish, butter, cheese, lard, vegetables, flour, meat, and other provisions;

* * * * * * * * * * * *

To preserve purity of streams, etc.

Twenty-fifth, To provide for clearing the rivers, ponds, and streams of the city, and the races connected therewith, of all drift wood and noxious matter; to prohibit and prevent the depositing therein of any filth or other matter tending to render the waters thereof impure, unwholesome, and offensive;

Relative to certain shops and offensive places.

Twenty-sixth, To compel the owner or occupant of any grocery, tallow-chandler shop, soap or candle factory, butcher-shop or stall, slaughter-house, stable, barn, privy, sewer, or other offensive, nauseous, or unwholesome place or house, to cleanse, remove, or abate the same whenever the council shall deem it necessary for the health, comfort, or convenience of the inhabitants of said city; * * * —(87.)

Abatement of nuisances dangerous to health.

(*) SEC. 2. The council shall have power to prevent and remove or or abate all nuisances dangerous to life or health within the city; and may require any person, corporation or company causing such nuisance, and the owner or occupant of any lot or premises upon or in which any such nuisance or cause of disease may be found, to remove or abate the same, upon such notice, and within such time, and in such manner as the council may by ordinance or resolution direct.—(89.)

Assignment of location for carrying on offensive or dangerous business.

(†) SEC. 5. The council, when they shall deem it necessary, may from time to time assign, by ordinance, certain places within the city for the exercising of any trade or employment offensive to the inhabitants or dangerous to the public health; and may forbid the exercise thereof in places not so assigned; and may change or revoke such assignments at pleasure; and whenever a business, carried on in any place so assigned, or in any other place in the city, shall become hurtful and dangerous to the health of the neighborhood, the council may prohibit the further exercise of such business or employment at such place.—(92.)

Erection and regulation of market-houses, etc.

(‡) SECTION 1. The council of any city shall have the power to erect market-houses, establish and regulate markets and market-places, for the sale of meats, fish, vegetables, and other provisions and articles necessary to the sustenance, convenience, and comfort of the inhabitants; to prescribe the times for opening and closing the same; the kind and description of articles which may be sold; and the stands and places to be occupied by the vendors.—(97.)

Rules to prevent fraud, etc., and to preserve order.

(‡) SEC. 2. The council may adopt and enforce such rules and regulations as may be necessary to prevent fraud, and to preserve order in the markets; and may authorize the immediate seizure, arrest, and removal from the market, of any person violating its regulations, together with any articles in his or their possession; and may authorize the seizure and destruction of tainted or unsound meats, or other provisions exposed for sale therein.—(98.)

Powers and authority, and exercise thereof.

(§) SECTION 1. Every village subject to the provisions of this act ¶ shall, in addition to such other powers as are conferred, have the general power and authority granted in this chapter, and the council may pass such ordinances in relation thereto as they may deem proper, namely:

* * * * * * * * * * * *

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* Laws of 1873,—Act No. 178, Chap. XIV.—page 306.
† Laws of 1873,—Act No. 178, Chap. XIV.—page 307.
‡ Laws of 1873,—Act No. 178, Chap. XIX.—page 314.
§ Laws of 1875, Act No. 62, Chap. VII.—pages 68, 69.
¶ Act No. 62, Laws of 1875.

Third, To abate nuisances, and preserve the public health;
* * * * * * * * * * * * *

Eleventh, To provide for and regulate the inspection of provision, firewood, and hay, on the public markets; * * * —(126.)

What is the ultimate executive power behind the boards of health?

This may be answered by the following sections of law:—

(1702.) SEC. 11. Whenever any person shall be convicted on an indictment for a common nuisance that may be injurious to the public health, the court may, in its discretion, order it to be removed or destroyed, at the expense of the defendant, under the direction of the board of health of the township where the nuisance is found; and the form of the warrant to the sheriff or other officer may be varied accordingly.—(47.)

Court may order nuisance removed in certain cases. 8 Mich., 117.

(1703.) SEC. 12. Whenever the board of health shall think it necessary for the preservation of the lives or health of the inhabitants to enter any building or vessel in their township, for the purpose of examining into and destroying, removing, or preventing any nuisance, source of filth, or cause of sickness, and shall be refused such entry, any member of the board may make complaint, under oath, to any justice of the peace of his county, whether such justice be a member of such board or not, stating the facts of the case, so far as he has knowledge thereof.—(48.)

Proceedings when admittance of board to building or vessel is refused.

(1704.) SEC. 13. Such justice may thereupon issue a warrant directed to the sheriff or any constable of the county, commanding him to take sufficient aid, and being accompanied by any two or more members of said board of health, between the hours of sunrise and sunset, to repair to the place where such nuisance, source of filth, or cause of sickness complained of may be, and the same destroy, remove, or prevent, under the direction of such members of the board of health.—(49.)

Idem.

(1738.) SEC. 47. When any place or building so assigned shall become a nuisance by reason of offensive smells or exhalations proceeding therefrom, or shall become otherwise hurtful or dangerous to the neighborhood, or to travelers, and the same shall be made to appear on a trial, or the admission of the person exercising such trade or employment, before the circuit court for the county, upon a complaint made by the board of health, or by any other person, the said court may revoke such assignment, and prohibit the further use of such place, or building, for the exercise of either of the aforesaid trades or employments, and may cause such nuisance to be removed or prevented.—(83.)

When places become a nuisance, assignment may be revoked, etc.

(6377.) SEC. 5. The circuit court for any county shall have equity jurisdiction in all matters concerning nuisances, where there is not a plain, adequate, and complete remedy at law, and may grant injunctions to stay or prevent nuisances.—(86.)

Equity jurisdiction in case of nuisance, etc. Walk. Ch., 112.

What redress has any person who is "injured in his comfort or the enjoyment of his estate by any nuisance?"

Answered by the following sections of law:—

(1739.) SEC. 48. Any person injured, either in his comfort or the enjoyment of his estate, by any such nuisance, may have an action on the case for the damages sustained thereby, in which action the defendants may plead the general issue and give any special matter in evidence.*—(84.)

Action on the case for damages.

See also section 6377, above.

It will be seen from the foregoing that the present laws of the State provide and explicitly point out the way in which every person aggrieved by any nuisance may find redress. If it is not done, the reason must be either that the person aggrieved has failed to make his grievance known to the proper officers or that those officers have failed to do their duty, a failure for which the State Board of Health, however much it may regret the fact, is not responsible and cannot atone.

*For provisions of law relating to actions under this section, see compiled laws, pp. 1796-7. One section from the act containing these provisions is given above, 6377.

The slaughtering and allied business sometimes grouped under the head of "offensive trades" are from time to time the subject of many complaints, as occasioning offensive odors, injurious to the comfort and health of persons in their vicinity. For that reason the law has made it the duty of the local boards of health in this State to assign certain places for carrying on these trades. Too often, it is true, this duty has been neglected and the law has almost become a dead letter, or is forgotten until some striking offense to the comfort or decided injury to the health of a community is occasioned, when the cry goes up for redress.

These trades, necessary to the comfort or even existence of every considerable community of people, must continue to be carried on. Can it be done in complete conformity to the laws of hygiene, and at the same time consistently with the pecuniary interests of those engaged in them?

In order to ascertain some of the faults in the present manner of conducting these trades, I caused the following circular to be issued and sent out to 40 or 50 health officers in various parts of the State:—

CIRCULAR OF INQUIRY CONCERNING SLAUGHTER-HOUSES, ETC.

TO THE HEALTH OFFICER OF .....

Will you please send, as soon as possible, in the enclosed directed and stamped envelope, answers to the following questions?

1. Please state the name of your city.
2. How many inhabitants in your city?
3. How many butchers or meat-market men are there?
4. How many places for slaughtering animals?
5. How many animals are annually slaughtered, specifying the number of
   a. Beeves—
   b. Sheep—
   c. Calves—
   d. Hogs—
   e. Other animals—
6. How many butchers do their slaughtering in one place?
7. How are the slaughter-houses situated in reference to the city limits?
8. How are they situated in reference to thickly settled portions of the city?
9. Are any of the slaughter-houses now offensive to people living near them or passing them?
10. Have any cases of sickness occurred fairly attributable to such causes? If so, state full particulars.
11. How are the slaughter-houses floored?
12. How are the blood, offal, and bones disposed of?
13. What is the drainage of the slaughter-houses?
14. Does the drainage from any of them go into a sewer?
15. How are they supplied with water?
16. What are the opinions of the men engaged in the slaughtering business as to the comparative economy and convenience of private separate slaughter-houses and *one* place in which all slaughtering should be done?

FAT-RENDERING AND BONE-BOILING.

17. How many fat-rendering and bone-boiling establishments are there in your city?
18. Are any of them, as now carried on, offensive to the people?
19. Do they cause sickness?

20. Have any complaints been made in your city as to unwholesome meats being offered for sale?

21. Are the meats now sold in your city properly inspected before being offered for sale?

22. With respect to fat-rendering, bone-boiling, etc., what are the opinions of the men engaged in the business as to the economy and convenience of private separate places, compared with one place in which to do all such work?

A prompt reply is respectfully requested by

H. O. HITCHCOCK,
Member of State Board of Health.

KALAMAZOO, May 26, 1879.

From the health officers of the following cities I have received replies which are here compiled.

CITIES.	Inhabitants.	Meat Markets.	Slaughter-houses.	Animals Slaughtered Per Annum.				Answers to Questions:—					
				Beeves.	Sheep.	Calves.	Hogs.	12.-Disposal of blood, offal, and bones.	13.-Drainage.	14.*	15.-Supplied with water.	16.-Whether butchers favor a common or separate slaughter-houses.	21.†
Muskegon	11,000	13	8	2,600	3,000	1,400	10,000	Fed to hogs—bones buried.	Fair	No.	From a well	Divided in opinion	No.
Niles	4,000	3	3	620	1,560	1,200	2,000	Fed to hogs	Good	No.	Well supplied.	One place	No.
Ypsilanti	6,500	6	2	1,000	1,000	1,100	.....	Hogs	River	No.	Wells	One place	No.
Coldwater	5,000	5	4	1,310	900	900	500	Hogs	None, or into creek.	No.	Wells and creek.	Separate places	No.
Ionia	4,500	6	3	1,200	1,600	600	2,100	Hogs	None	No.	Wells	Divided in opinion	No.
Monroe	7,000	5	5	180	432	432	432	Hogs	River	No.	Wells	Separate places	No.
Bay City	18,000	20	10	.....	.....	.....	.....	Fed to hogs—bones shipped	Ditches and river—none.	No.	Wells	Many use one place	No.
Grand Haven	5,000	5	4	1,800	1,900	150	80	Hogs	Good	No.	Wells	.....	No.
Marshall	4,000	12	3	700	500	270	85	Hogs	None	No.	Wells	.....	No.
Big Rapids	3,500	3	3	.....	.....	.....	.....	Hogs	Creek	No.	Wells	.....	No.
Dowagiac	3,000	5	3	300	400	300	400	Hogs—bones buried.	Into a sink	No.	Wells	Separate places	No.
Charlotte	3,500	3	3	650	350	450	150	Hogs	None	No.	Creek	Separate places	No.
Cadillac	2,000	3	1	150	.....	10	150	Hogs	None	No.	Wells	.....	No.
Flint	10,000	8	5	3,000	5,000	4,000	2,000	Hogs—bones burned.	None	No.	River	Divided in opinion	No.
Greenville	3,500	5	5	1,000	600	500	1,200	Hogs	Into a sewer	No.	Wells	Separate places	No.
St. Clair	2,000	5	3	900	1,050	550	900	Hogs—bones buried in country.	None	Yes.	Wells and cistern.	One place not practicable.	No.
Saginaw	11,000	11	5	1,700	500	1,000	400	Hogs	None	No.	Wells	Separate places on acc't of pasturage.	No.
Mason	2,000	2	2	300	300	350	250	Hogs	None	No.	Wells	Separate places here, but in large places *one*.	No.
Jackson	18,000	15	5	8,000	8,000	6,000	8,000	Hogs—bones boiled.	Very poor	No.	Wells	All prefer one place if it could be done.	No.

* Are any of the slaughter-houses drained into a sewer?
† Are meats now sold properly inspected before being offered for sale?

It will be seen that these reports are from cities containing respectively from 2,000 to 18,000 inhabitants, and may probably be considered a fair average of the cities and towns of the State outside of Detroit.

The number of butchers or meat-market men in these several places range from 2 to 20, and the number of places for slaughtering from 1 to 10.

The numbers of animals slaughtered in a year were not given in two cases; in the seventeen reports in which they are given the average number of animals per 1,000 inhabitants is as follows: of beeves, 246; of sheep, 262; of calves, 190; of hogs, 285.

The blood, bones, and offal were said in most of the reports to be fed to hogs. In a few instances the bones were said to be boiled and the meat and soup fed to hogs, while the bones, after being boiled, were burned or buried; while in one or two cases the bones were said to be "sold and shipped off;" and in one instance the "blood and offal and bones" were said to be "carted into the country and buried." In no case were the "blood, bones, and offal" said to be used on the premises in such a way as to be converted into pecuniary profit.

The drainage of these slaughter-houses, except a very few standing on the banks of small streams, is said to be "none," which means that all the "washings," and the "soakings," and the liquid filth was poured upon the ground, under or immediately around the buildings, to saturate the ground, and gradually to contaminate the *wells from which, in most instances, the water supplied for the premises was drawn.*

In no case were the meats said to be inspected, either before slaughtering or after, although mention is made in several cases of complaints having been made of unwholesome meats being offered for sale.

Situated as the reports represent the slaughter-houses generally to be, "without drainage," the "blood, bones, and offal fed to hogs" on the premises, water only supplied by pumps from wells, it is a little surprising that in only two or three instances were they reported to be "offensive" to people living near to, or passing by, them. With all the elements around them that in the heat of summer would tend to make their "offense rank," and "smell to heaven," it must be that they were very cursorily examined, and perhaps at a distance, by the health officers, or else these officers had been so vigilant, and so imperious in their requirements of sanitary regulations about these places, that they were the very patterns of neatness, and like the realms of the goddess Hygiea.

Very few fat-rendering or bone-boiling establishments are mentioned in the report, except such business of the kind as was carried on by each butcher at his own private slaughter-house. In one instance such a place is spoken of as being "intolerably offensive."

The majority of the butchers in the cities and towns whose health officers have reported, appear to be satisfied with the manner of conducting the business in separate slaughter-houses, and of rendering the fat in the same buildings, while the blood and offal are virtually nearly or quite thrown away.

In a few of the larger places the opinions of the men engaged in the business are reported as divided upon the question of separate and private slaughter-houses, or a common abattoir, while in two or three instances they are said to favor the abattoir if it can be brought about.

Of the want of economy, even the great waste, of doing the slaughtering of animals and the rendering of the fat in so many separate places—to say nothing of the loss of the blood and the bones—I shall speak further on.

The reports now compiled show that in nearly all the places the slaughter-houses are situated outside the corporation limits, or at least at a distance from the thickly-settled portion of the city or village. In some instances they are upon the banks of, or near to, sluggish streams, and located on low wet or even swampy land, where the drainage or the washings are allowed to pool and fester in the sun. None but three or four reported on are supplied with water otherwise than by wells or pumps. It is according to human nature that if all the water must be pumped as little will be used as is possible, while an *abundance* of pure water is necessary to be used every day or many times a day to keep such a place in proper sanitary condition.

It appears that the present laws of this State empower the local boards of health to assign certain places for carrying on trades or business offensive or dangerous to the public health. Sections 46 and 47 of chapter 35 of the revised statutes of 1846, being chapter 46 of the compiled laws of 1871, read as follows:—

Places may be assigned for carrying on offensive trades.

(1737.) SEC. 46. The township board of every township, the president and trustees, or council, of every village, and the mayor and aldermen of every city, respectively, when they shall judge it necessary, shall, from time to time, assign certain places for the exercising of any trade or employment offensive to the inhabitants or dangerous to the public health; and they shall forbid the exercise thereof in places not so assigned; and all such assignments shall be entered in the records of the township, village, or city, and they may be revoked when the said township, village, or city officers may think proper.—(82.)

When places become a nuisance, assignment may be revoked, etc.

(1738.) SEC. 47. When any place or building so assigned shall become a nuisance by reason of offensive smells or exhalations proceeding therefrom, or shall become otherwise hurtful or dangerous to the neighborhood, or to travelers, and the same shall be made to appear on a trial, or the admission of the person exercising such trade or employment, before the circuit court for the county, upon a complaint made by the board of health, or by any other person, the said court may revoke such assignment, and prohibit the further use of such place, or building, for the exercise of either of the aforesaid trades or employments, and may cause such nuisance to be removed or prevented.—(83.)

This chapter was amended at the last session of the legislature (1879) by adding to it two new sections, 50 and 51, as follows:—

Slaughter-houses, etc., not to be kept within twenty rods of highway.

SEC. 50. No person shall keep or maintain any slaughter-house, slaughter-yard, or slaughter-pen, or any other place for slaughtering, [butchering] or killing any animals, or rendering dead animals as a business, within twenty rods of any public highway within this State, or in any other place, except as provided in section forty-six of this chapter.

Penalty.

SEC. 51. Any person offending against any of the provisions of the preceding section shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be punished by a fine of not more than one hundred nor less than twenty dollars, and in default of the payment of such fine shall be imprisoned in the county jail of the proper county not more than ninety nor less than twenty days, in the discretion of the court: provided, that the provisions of this act* shall not apply within the limits of incorporated villages and cities.

The power given in section 46, to assign places for carrying on these trades, and the power given in section 47, to revoke such assignment if the trades are carried on in such a manner as "to become a nuisance by reason of offensive smells or exhalations proceeding therefrom," would seem to imply that the local boards of health would have the right and the power to prescribe certain rules to be complied with in the carrying on of these trades, so that they should

* That is, of the amendatory act (No. 232) passed in 1879, and which comprises the two sections (50 and 51) here quoted.

not become offensive or dangerous to the public health. Each local board of health must be the source of these rules, and must see that they are complied with within their own jurisdiction. They should not be arbitrary or unreasonable. It is believed that the proper rules for the sanitary conduct of these trades will always be found not only to be consistent with, but actually subserving, the pecuniary interests of the tradesmen, when well understood and intelligently applied.

As it would be better that the rules adopted in such cases by local boards of health should be uniform, the State Board of Health recommends for adoption, by the several local boards of health throughout the State, the following

RULES AND REGULATIONS FOR THE CONDUCT OF SLAUGHTER-HOUSES, AND FOR RENDERING OR BONE-BOILING ESTABLISHMENTS.

1. It is desirable, when practicable, and it is believed to be subservient not only to the convenience but also to the pecuniary advantage of those engaged in the business, that all the slaughtering, as well as all the rendering, etc., should be done at one place.

2. Location of slaughter-houses, etc.:—

a. An abattoir, if thoroughly drained into a properly-constructed sewer, and if no blood or offal are fed to swine on the premises, and which shall be conducted strictly according to the rules below, *may* be allowed within the limits of a village or city.

b. Small, separate, or private slaughter-houses should, as a rule, be outside the village or city limits, or at least in the very thinly populated portions, and not within twenty rods of any public highway.

c. They should be located on dry, hard land, that can be well drained.

d. They should be amply supplied with clean, wholesome water, from springs, wells, or unpolluted streams.

e. They should be floored with a tight, solid floor, of hard wood, or of cement or well-joined stone.

f. The yards, sheds, and close pens should be dry, and free from mud and filth, and their sides or walls should be thoroughly white-washed at least twice a year.

3. The slaughter-house and all its apparatus should be kept in a neat and orderly manner, free from all offensive smells.

a. When the slaughtering for the day is completed, the sides and floor of the slaughter-room should be thoroughly washed with an abundance of clean water. No other disinfectant will be required.

b. No animal matter of any kind should be permitted to remain in, under, or near the slaughter-house to decompose or putrify.

4. When blood and offal or immature animals are fed to swine on the premises, such arrangement shall be made that those materials shall be speedily consumed, and that the unconsumed portions shall be prevented from giving off offensive smells, as follows:—

a. The blood of all the slaughtered animals should be conducted by a water-tight gutter to a water-tight trough in the hog-yard.

b. The offal and bodies of immature animals should be thrown into a pen with a tight, dry floor, to be consumed at once by the swine; and all portions not consumed within twenty-four hours should be removed from the pen, and should be burned, buried, or composted with fresh earth.

5. When the blood or offal are not fed to swine on the premises, they should every day be carted off in close tanks, and in other places treated as described

above in rule 4, or should be converted into fertilizers, or otherwise utilized by an apparatus, the gases arising from which should be carried under the furnaces and consumed.

6. The heads, legs, and other bones may be treated as follows: either—

a. They should be boiled within forty-eight hours, for the extraction of grease or oil, or for soup to be fed to swine, and when thoroughly boiled should be dried and put into covered receptacles, ready for shipping to bone-dealers; or—

b. Should be shipped as often, at least, in the summer, as once in two days.

7. The fat, and all materials from which fat or oil is to be extracted, should be rendered within such time after the slaughtering of the animals that no offensive odors shall arise from them, or from the process of rendering.

It is believed that slaughter-houses of every capacity, carried on in accordance with the foregoing rules and regulations, will be so free from offensive smells as not to be injurious to the health of anyone, and justly obnoxious to the complaints of no one.

It will be far more difficult to cause several small private slaughter-houses to be conducted in strict accordance to these rules than one common abattoir, properly constructed and supplied with all the convenient apparatus for carrying on such business.

It is believed that such an abattoir would be found economic to the butchers of any city or village of 4,000 or more inhabitants. The following paragraphs are quoted from the Third Annual Report of the State Board of Health of Massachusetts, for the year 1872, pages 224–6:—

"The first report of the [Massachusetts] State Board of Health (January, 1870,) contained a report on 'Slaughtering for Boston Market,' in which reform was urged on the grounds of public health and of economy.

"The arguments to show its necessity were drawn from various sources, but chiefly a careful examination of the whole system (or rather want of system) as it existed in the neighborhood of Boston. The Brighton slaughter-barns were shown to be without drainage and surrounded by filth of the most revolting kind, coming from the half-putrid blood and offal. On this disgusting food hogs were fed, destined to make pork for our markets. This, in fact, was the only mode of disposing of the refuse portion of the slaughtered beeves and sheep. The dangers to the consumer were pointed out in the liability to have meats from diseased animals dressed for the markets.

"Fat-melting and bone-boiling, as carried on the vicinity of Boston, were described, and the odors proceeding from these places, as well as from the open vats used for boiling dead horses and other animals, were shown to be sickening and vile, such indeed as no one should be compelled to breathe,—an encroachment, for private convenience, upon the greater rights of the general public who can demand protection from such nuisances.

"The remedies for this state of things were definitely stated. They were to be found in the concentration of the business of slaughtering in large establishments, where every part of the animals could be utilized on the spot in the most cleanly and economical manner, without the stench of putrefaction, or the waste incident to transportation and to the use of clumsy processes.

"It was also shown that the boiling of animal matters could be conducted in such a way that all offensive vapors should be consumed by fire.

"The value of the blood now wasted, and worse than wasted, in filthy pig-pens, was represented to be very great.

"It was shown to be capable of conversion into a fertilizing powder, worth more than Peruvian guano, or to be used for extraction of its albumen, now largely required in the arts.

"The report closed as follows:—

"'To complete the reform in the modes of slaughtering in the vicinity of Boston in such a way that nobody shall suffer and everybody shall gain, there are needed one or more *abattoirs*, containing all the improvements which European experience

can furnish or modern science suggest. They need not be expensive buildings, although they should occupy a large space. They should have comfortable stables for protecting and feeding the animals. As regards the slaughter-house itself, the essential things seem to be,—

"'1. A pavement of stone or of some material impervious to blood.
"'2. An abundant supply of water.
"'3. Complete drainage.
"'4. Vats for the 'rendering' of fat and offal on the spot, before putrefaction can attack them.
"'5. The means of converting blood into blood-albumen.

"'The *sanitary* advantages of such a system would be,—

"'1. The removal of the present offensive odors.
"'2. The removal of slaughter-house pork from the markets.
"'3. The ready inspection of meat, thus insuring the rejection of that which is unfit for food.

"'The *economical* advantages would be,—

"'1. Diminished liability of having meat spoiled by exposure to the emanations from the putrid pig-pens.
"'2. The value of the blood, which would be saved and utilized.
"'3. The savings which must always accompany order, system, the division of labor, the avoidance of transportation, and the doing any business on a large scale.
"'4. The greatly increased value of land in the vicinity of the present slaughter-houses.'

"In looking at the above conclusions in the light of two years' additional experience, we believe they are correct. There might now be added to the economical advantages a more distinct recognition of the value of offal, as well as of blood, for conversion into a fertilizer." *

This report was followed by two years of well-directed effort and much labor on the part of the Board, in meeting the objections and thwarting the opposition of the butchers, who were determinedly settled in the old way of doing the business. At the end of the two years however a charter for the "Butchers' Slaughtering and Melting Association," granted by the legislature in 1870, was accepted by the butchers of Brighton, who thenceforward worked together with the State Board of Health for the common good.

"Such changes cannot be made in a moment. They require deliberation, a regard for the rights of property, and a careful consideration of many details of construction. The Board had, in anticipation of what has now come to pass, collected information concerning all the great European abattoirs, and made some preliminary plans adapted to American use." †

They then spoke with confidence of their proposed abattoir, as follows‡:—

"Here will centre in the future a business of great magnitude, whose influence on the public health and welfare cannot fail to be good,—where it will be shown, as we believe, that slaughtering can be done without offense to any one,—where animals can be readily inspected before being killed, and the purchaser thus guaranteed wholesome meat,—where the fats and the hides can be immediately treated by safe methods,—and where all animal refuse can be converted on the spot, while yet fresh and untainted, into a fertilizer free from offensive smell, and of great commercial value.

"All this direct and positive good will quite surely come from the new establishment. But this is not all. Order will take the place of disorder. Violence and brutality will be discouraged. We shall no longer see, in the heat of midsummer, cattle and sheep left without shade, or food, or water.

"The inspection of animals at the abattoir will tend very strongly to check the horrible treatment which they now so often receive on the railroads, since no animals not in health can be killed.

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* Third Annual Report of the Massachusetts State Board of Health, for the year 1872, pages 224-226.
† Report of State Board of Health of Massachusetts, 1872, p. 241.
‡ From same, pages 241-243.

"This inspection will operate, by the strongest of all motives, as an incentive to good treatment of the animals before they reach Brighton from any quarter.

"There will be an end not only of the dressing for the markets of animals arriving dead, but also of the 'killing of animals to save them' from speedy death by disease.

"The Brighton slaughter-house hog will disappear, or will get more wholesome food than he received from the putrid blood and entrails of other beasts.

"But the advantages to flow from the abattoir will not stop here. There are, all over Massachusetts, in cities and towns and villages, slaughter-houses and bone-boiling and fat-rendering places which are nuisances,—Brightons on a smaller scale, but offensive in the same way—and which good-natured people have borne with, as evils which must of necessity be endured because they could not be cured.

"If it can be proved at Brighton that there are methods, both economical and inodorous, by which these trades can be conducted, it will be a lesson whose good effects will be perceived far and wide.

"What these plans and processes should be at the Brighton abattoir it is yet too soon to explain in detail. But the general principles on which they must be founded are, order or system, and the prevention of putrefaction.

"As regards *slaughtering*, whether at Brighton or elsewhere, there are needed building materials impervious to blood, abundant water supply and drainage, and the means of putting every part of the slaughtered animals into a form which will not decompose, *each day*.

"As regards *bone-boiling and fat-melting*, if the material to be used is fresh, and unchanged by any taint of decay, the vapors coming from it can be condensed in water, and there are several available plans for doing this without offense, if water is abundant and drainage complete.

"If, however, the material is tainted, as is certain to be the case in the waste animal matter collected in a large city, there is no process known to us by which the complex gases thus combined with watery vapor can be destroyed, except by fire."*

In their ninth annual report, for 1878 (pp. vii–x), the Board speaks of what had then been accomplished by the "Butchers' Slaughtering and Melting Association," as follows:—

"The Brighton Abattoir, now for two years in charge of the Board of Health of Boston, continues to be satisfactorily managed, having facilities for slaughtering seven-eighths of the cattle needed in the metropolitan district, and for disposing of the various kinds of offal, etc., necessarily connected with business of that kind, in a manner inoffensive and without injury to health. A brief description of the more important processes, taken from a small pamphlet sent by the Board to the Paris Exposition, with plans of the abattoir, may be of interest, as indicating what has been accomplished, and as being, to a certain extent, a guide to local authorities throughout the State, by showing the principles of dealing with slaughtering-establishments, large and small, in the various cities and towns.

"'For convenience in caring for the blood and offal, the plan of slaughtering on a raised floor, above a basement story, was adopted. This floor is of double plank, calked, and well laid on beams, with a slope to an iron gutter running across the center of the floor, which receives the blood and conveys it to iron wagons in the basement, which has a floor of asphalt. Several trap-doors in the floors of the slaughter-houses receive the heads and feet, hide, tallow, and offal, each dropping into separate iron wagons below. The various wagons, as often as filled, are wheeled into the rendering-house; the hides being salted in the basement, and the blood, offal, heads, fat, and tallow being raised to the rendering-tanks and driers by means of elevators.

"'In most of the buildings the cattle are hoisted for dressing by steam-power, through shafting connected with the engine in the rendering-house, to which the necessary pulleys are attached; although in some of the buildings the old method of hoisting by hand, with the wheel and rope, is still carried on.

"'Hot and cold water are supplied to each slaughter-house, and the floor and walls of each house are thoroughly washed at the close of each day's killing. The water, in abundance, is the only disinfectant used, even in hot weather.

"'Connected with each house is a refrigerator, in which all cattle are placed after having been dressed. They are allowed to remain from several days to a couple of

* Third Annual Report Massachusetts State Board of Health, for 1872, pages 241-243.

weeks before sending to market. These refrigerators vary in their capacity; those attached to the smaller houses furnishing space to hang sixty cattle, while in some of the larger houses as many as two hundred can easily be stored. The arrangements for slaughtering sheep and disposing of the blood and offal are substantially the same as above described for cattle.

"'In the rendering-house are placed, in the fifth story, two large iron water-tanks, each holding about fifty-eight thousand gallons. These tanks are filled by steam-pumps in the engine-room, and are connected by distributing-pipes with nearly all the buildings and yards on the premises; also with several hydrants, for use in case of fire. The rendering-tanks are suspended from the floor of the fourth story, and are filled from that story with the offal, heads, and tallow contained in the small iron wagons coming from the basements of the slaughter-houses. Different tanks are used for the various processes of making tallow, fertilizers, etc. After the contents of the rendering-tanks are sufficiently cooked, the fat is drawn off and packed. The residuum from the tanks in which bones and intestines are cooked, the scraps, or what remains after being pressed, are put into the driers, which are located in the second story, but are filled through pipes leading into them from the third-story floor. The blood is also put into the driers here, after having been partly dried in the tanks. The contents of the driers are subjected to steam-heat, by means of revolving sets of steam-pipes inside of them, for several hours, until the water has been sufficiently evaporated; when they are discharged upon the second-story floor, and after being passed through a mill, to grind any particles of bone that may not have become sufficiently fine in the process of cooking, are disposed of as a fertilizer. This fertilizer is made by mixing together the dried products of rendering the bones, intestines, and blood. In the large building in the process of construction, sulphuric acid and other chemicals are to be added, in varying proportions, to be adapted to the needs of various crops, and to suit the demands of different soils.

"'The feet are cooked in the third story, to extract the neat's-foot oil from them; and the tallow, grease, oil, shin-bones, and hoofs are stored in various parts of this building.

"'The steam and offensive gases from the rendering-tanks and driers are received into a large iron vessel, through which cold water is continually passing, where the steam is condensed; the offensive gases pass on into a large pipe, from which they are drawn by a fan. The aqueous vapor having been condensed and left behind, the gases are mixed with large volumes of air by means of a patent blower, and then pass under the furnace fires to be consumed. The furnaces are so arranged that when the fire is low, or when fresh coal is added in any one the gases can be directed under another furnace where the fire is burning briskly, so that complete combustion is always accomplished; and there are no offensive odors at any time, although such a large mass of animal matter is constantly treated day and night.

"'The tanks in which the offal is cooked for a varying number of hours, depending upon its character and use, have, at the end of that process, a certain amount of water in them, containing in solution and in suspension a certain amount of gelatine. This is called soup; and that which comes from boiling the heads and the feet is still further boiled down for the purpose of making glue, which finds a ready sale in the market; the rest of the soup is thrown away.

"'The best portions of the fat are tried out for making artifical butter. The shin-bones are sold for knife-handles, etc. The hoofs are manufactured into various articles of use and ornament. The offal removed from the stomach and intestines is carted away from time to time, to be used as manure.

"'All offal and blood are rendered and dried immediately while fresh and untainted. The plan of elevating the slaughtering-rooms, so that all blood, offal, etc., may be dropped into the wagons in the basements, renders the labor of keeping those rooms clean comparatively easy. This, as well as the system of receiving the products of slaughtering in iron wagons and raising them on elevators to the tanks and driers, has proved very satisfactory.

"'The method adopted for the destruction of the gases after rendering prevents any offensive odors arising therefrom. It requires and receives constant and careful attention by day and night; and the experience of the past four years and a half has proved the possibility of carrying on a large slaughtering and rendering establishment without offense or annoyance to the community around it.

"'During this time there have been slaughtered 282,857 cattle and 1,321,573 sheep, an average of nearly 63,000 cattle and 294,000 sheep each year. The fertilizer manufactured, from the blood and offal from this slaughtering, has ranged from 1,200 to 1,500 tons a year. The expense incurred for the purchase and preparation of land, for

erecting buildings, and for providing machinery necessary to carry on the business, has been about $630,000.'"*

In July, 1879, I paid a visit to the Brighton abattoir, and was fortunate in being shown through all its appartments by the very intelligent overseer of the works. I found everything about the premises and buildings substantially as described above.

I witnessed all of the processes in actual operation. I saw and handled the dried powders that twenty-four hours before were blood, flowing in the vessels of cattle, or their entrails, or bones of their heads, all of which were without offensive odor and ready to be shipped to the manufacturers of fertilizers. I was told that the institution now cleared $40 per day from the blood and offal that used to be thrown to hogs, partly eaten by them and largely trodden into the mud, and by their decomposition used to render the air of the whole vicinity unfit to be breathed.

From that visit I was inspired with the confidence that what has been done for Brighton by the abattoir may be done for every town or city of 4,000 or more inhabitants, by centering the slaughtering and rendering trades in one place.

Assuming that every slaughter-house will be required to be constructed and conducted in accordance with the above proposed rules and regulations, the following economic advantages, it is believed, will attend the abattoir system:

In such an abattoir for a town or city of from 4,000 to 20,000 inhabitants,—

1. All the slaughtering could be done in one or, at most, two rooms instead of from three to ten, as at present, and much money would be saved in its better construction.

2. The most approved and convenient apparatus for these one or two rooms would be of less cost than that used in the three to ten private slaughter-rooms.

3. The sheds and stables would be less expensive for the one than for the two to ten.

4. Proper drainage could be secured for the one at far less expense.

5. Abundance of water could be supplied more cheaply. If no water-works are in the town, a windmill would keep a tank in the upper part of the building constantly supplied.

6. Even a large range of pasturage could be more easily secured for one place than for three to ten places.

7. As regards the bones and offal, which, in separate slaughter-houses it is not economy to save, in such an abattoir they would be found to be the source of a considerable profit.

8. It is evident, too, that the rendering now done in separate places could be done with a great saving of apparatus and of fuel if all could be done together.

9. But one of the greatest advantages of a properly constructed abattoir, especially in the hot weather, is the ice-room or cooling-room, where the dressed meats may be allowed to hang from a few days to two or three weeks, until they are thoroughly "ripened" and rendered most fit for table use. Every butcher and many consumers know how much better meats fairly "seasoned" are than those just slaughtered.

* Ninth Annual Report of the State Board of Health of Massachusetts, for the year 1872, pages vii-x.

In private slaughter-houses such a cooling-room is not often found. In an abattoir such a room, capable of holding 10 to 50 dressed beeves and 25 to 100 smaller animals, could be made and conducted without great expense.

I cannot close this report without expressing the hope and the confident belief that the time is not far distant when in every town of 4,000 or more inhabitants the slaughtering and rendering business will be concentrated in a suitably constructed and properly conducted abattoir.

KALAMAZOO, MICH., August 26, 1879.

SANITARY ASSOCIATIONS.

—BY—

JOHN H. KELLOGG, M. D.,

OF BATTLE CREEK, MICHIGAN,

MEMBER OF THE

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON DISPOSAL OF EXCRETA AND DECOMPOSING ORGANIC MATTER.

SANITARY ASSOCIATIONS.

At the last meeting of this Board, held July 8, 1879, the following resolution was adopted:—

"*Resolved*, That this State Board of Health heartily favors the organization of Sanitary Associations, auxiliary to local boards of health."

A similar recommendation was made by the Sanitary Council of the Mississippi Valley, at its first meeting, at Memphis, Tennessee, itself a voluntary association, composed of delegates from State Boards of Health, and other sanitary organizations of the Mississippi Valley. Public attention has been called to such associations in part through the example and the work of the American Public Health Association, an organization composed of most of the leading sanitarians of the country, whose object is by the constitution declared to be "the advancement of sanitary science, and the promotion of organizations and measures for the practical application of public hygiene."

Shortly after the meeting referred to, I received from the Secretary of the Board several documents relating to Protective Sanitary Associations, accompanied by a request to prepare a paper on the subject to present at this meeting. The documents sent to me by Dr. Baker, and of which I have made use, are as follows: General Outline of the Sanitary Protection Association of Newport, R. I.; Rules of Organization of the Sanitary Association of Lynn; a blank form for Inspector's Report, used by the Lynn Association; Sanitary Tract No. 1, on the Prevention of Cholera Infantum and Kindred Disorders, issued by the Sanitary Association of Lynn; Sanitary Tract No. 2, issued by the Citizens' Health Association of the Oranges, Bloomfield, and Montclair, entitled "Suggestions Concerning the Sanitary Care of Premises." I have also consulted the following additional works in the preparation of this paper: Handbook of Hygiene, Wilson; Filth diseases and their Prevention, Simon; Manual of Public Health, Hart; The Maintenance of Health, Fothergill; Sanitary Arrangements for Dwellings, Eassie; Manual of Hygiene, Cameron; Hygiene and Public Health, Buck; House Drainage and Water Service, Bayles; Manual of Practical Hygiene, Parkes; together with numerous works of less direct bearing upon the subject.

ORIGIN OF SANITARY PROTECTION ASSOCIATIONS.

Great Britain, which unquestionably takes the lead in nearly all questions relating to sanitary science, seems to have been foremost in this advance also. According to Dr. Tracy, who contributed a valuable article on Village Sanitary Associations to the recently published volumes on Hygiene and Public Health, edited by Albert H. Buck, the first sanitary association formed for the pur-

pose of mutual protection by private citizens, and wholly independent of government assistance or authority, was organized at Tottenham, Eng., in 1871. In 1878, a very efficient organization of this kind was formed in Edinburgh, the plan of which was shortly after adopted in this country by an organization formed at Newport, R. I., called the "Sanitary Protection Association of Newport." The formation of the Newport Association was in a few months followed by the organization of the "Sanitary Association of Lynn," Mass., which also adopted, a little more than eighteen months ago, the same general plan conceived and developed by Prof. Fleeming Jenkin, of the University of Edinburgh.

OUTLINE OF THE NEWPORT AND LYNN ASSOCIATIONS.

The following is a brief outline of the plan of organization adopted in the associations named, based chiefly upon the "Rules of Organization" published by the Lynn Association, which seem to be more thoroughly perfected and more methodically arranged than those of the Newport Association.

The objects of the Association are stated to be:—

"1. To promote a general interest in sanitary science, and to diffuse among the people a knowledge of the means of preventing disease.

"2. To secure the adoption by the city authorities of the most effectual methods of improving the sanitary conditions of the city.

"3. To provide its members, at moderate cost, with such skilled inspection as shall secure the proper sanitary condition of their own premises, and those of other people in whom they may be interested."

Any citizen becomes a member upon paying the annual assessment. The Lynn Association requires $5 as an annual fee. The fee of the Newport Association is $6 for permanent residents, and $10 for those who spend only a part of their time in the city. The names of members who neglect to pay their annual dues for three months are dropped from the roll of membership.

Each member is entitled to vote in the meetings of the Association, and to take part in all the business transactions. He is also entitled to "an annual inspection of one homestead or other building, with a report upon its sanitary condition, by some competent person or persons employed and paid by the Association," and to occasional supplementary inspection and advice concerning said homestead or building, as upon the occurrence of any severe or suspicious disease on the premises, or during the prevalence of an epidemic; also inspection of other buidings, either public or private, in which he may have interest, upon such terms as may be determined by the council.

The officers of the Association are a president, a secretary, a treasurer, and eight councilors, who are elected at the annual meetings. The above-named officers, together, constitute the executive council of the Association, which is authorized to fill its own vacancies, and is required to appoint from among its own number the following committees, consisting of three members each, which are subject to its direction: 1. A committee on the diffusion of sanitary knowledge; 2. A committee on the sanitary condition of the city; 3. A committee on the sanitary inspection of buildings; to each of which, together with the officers of the Association, are assigned appropriate duties.

The executive committee is also authorized to appoint "such officers or agents outside of its own number as it may deem necessary in carrying out the objects of the Association, and to compensate the same." The agents thus employed by the Lynn Association consist of a legal adviser, an assistant inspector, and a chemical analyst.

The executive council is to meet at least once in three months, at which times its several committees are required to report. Five members of the council constitute a quorum. The Association meets once a year to listen to the report of the executive committee, and to elect officers for the ensuing year, one-fifth of the members of the Association constituting a quorum.

Special meetings may be called at any time by the executive committee, and by the Secretary, on the written request of ten members.

Such special regulations respecting the inspection of buildings are adopted as are calculated to secure prompt and efficient inspection, and suitable remuneration for the same. An elaborate blank form for inspectors' reports has also been prepared, the proper filling of which requires a thorough investigation of the general state of the building inspected, of the water-supply, drainage, and surrounding premises. The special subjects of investigation under these several heads are as follows:—

General State of House.—Bed-chambers, halls, kitchens, stove-rooms, cellars, refrigerators.

Water-Supply.—Wells, city main, cisterns.

Drainage.—Water-closets, set bath-tubs, set wash-bowls, slop-hoppers, set wash-tubs, kitchen-sinks, soil-pipes, waste-pipes, drain from house, drain from cellar, house offal, cess-pools, ashes, etc.

Out-Buildings.—Stable, hog-pen, hen-house, privy.

Memoranda on various other subjects pertaining to the sanitary condition of the house and premises are called for.

The forms employed by the Newport and the Lynn Associations are essentially the same, the latter differing from the former chiefly in having a more convenient arrangement.

REASONS FOR THE ORGANIZATION OF SANITARY ASSOCIATIONS.

1. Probably the strongest and most obvious reason which can be assigned for the encouragement of organizations similar to those described is the difficulty which is often experienced by sanitarians and those who appreciate the importance of attention to the requirements of sanitary laws in securing proper and efficient action on the part of city and village authorities who are empowered by law to adopt and enforce such measures as may be needed for the protection of the public health. This fact was well illustrated at Newport before the organization of its Sanitary Protection Association. From facts kindly placed in our hands by Dr. H. R. Storer, corresponding secretary of the Newport Association, we learn that during several years previous to the formation of the Protection Association the attention of both city authorities and private citizens was repeatedly called to the extremely unsanitary condition of that city by eminent physicians, but, to use the words of Dr. Storer, with "no appreciable effect upon the public opinion of Newport as represented by its officials."

The experience of the sanitarians of Newport is not different from that of those of hundreds of other cities and villages. Notwithstanding the large amount of knowledge on other subjects which has long been possessed by the medical profession, it is but recently that State and municipal authorities have taken any active interest in matters pertaining to public sanitation. Even at the present time, the interest in the subject in the quarters indicated, is but slight compared with the paramount importance of the subject. The greatest loss annually incurred by any commonwealth is the expense and loss

occasioned by the sickness and death of its citizens. The lives and health of its citizens are the most valuable property possessed by any government; and whatever in any manner affects these, influences in the highest degree national prosperity. These facts are too patent to require the presentation here of the statistical data upon which they are based.

There has been a quite general awakening upon this important subject within the last few years, through the earnest labors of eminent and public-spirited sanitarians, and recently, especially, through the yellow fever epidemic in the South, and the earnest efforts made by the American Public Health Association and other sanitary organizations to secure proper action on the part of the National, State, and local authorities with reference to this terrible, but preventable scourge. Nevertheless, there are at present very few States and a still smaller proportion of the cities and villages of the country, which are sufficiently awakened upon the subject of sanitary reform to appropriate anything like the amount of funds needed to secure the efficient carrying out of measures necessary to secure the public health. Where State and local boards of health are appointed and invested with authority to act, they are on this account often so crippled that their efforts are of little practical value. In many instances, also, it is unfortunately the case that those who are invested with proper authority, and by law supplied with all the necessary means for performing their duties, are so obtuse to the necessity for action, or so ignorant of what is demanded of them, that the good which they might do remains undone. It is rare, indeed, that so astonishing a degree of ignorance is met with as was exhibited by a New York city health commissioner a few years ago, who, when being subjected to an examination in consequence of a complaint entered by an intelligent physician, replied that "hi-jin-nicks" [hygienic] means "a bad smell arising from dirty water;" but it is almost equally rare to find among local health officers that keen and intelligent appreciation of the importance of correct sanitation, and of the responsibilities of the position, which is necessary to make such officers thoroughly efficient in the performance of their duties.

Sanitary associations formed upon a plan similar to the Newport organization, adapted to the conditions and requirements of small towns and villages, would be of great use in securing diligent and efficient efforts on the part of local officers or boards of health where they exist; and where they do not, certainly such associations are needed to accomplish so far as possible the work which should be performed by such authorities.

2. Sanitary protection associations may be of very great service not only to members but to the public generally as auxiliaries of local health boards or other health authorities. The strong backing that such an organization could give to a local health board, and the aid that it might give by calling attention to evils which would otherwise be likely to be overlooked, as well as in carrying out the regulations of the board, in many ways exerting a strong influence in favor of sanitary reform, would be invaluable. An organization of the kind described would have far more influence with the majority of the people of a small town or village, than would any health board or officer. The majority of people are much more easily led by example than by authority; and this is especially true respecting such subjects as that of sanitation, concerning which even the better classes as yet know but little. Most people have a laudable desire to be "as good as their neighbors," or at least to appear to be so, and if they see their next-door neighbor setting his house and

premises in order in complying with the requirements of sanitary science, they will in a great many cases be led to follow the example set. If to this influence be added, for the benefit of persons of weak principles or sordid indifference to these important questions, the moral force of wholesome police regulations respecting the sanitary care of dwellings and premises, etc., we shall bring to bear upon individuals a twofold pressure in a direction which cannot fail of securing good results.

3. In the practical discharge of their duties health officers cannot, in general, get very much in advance of the general sentiment of the people of the community in which they may be laboring. The health officer depends, in a great measure, upon the people for information respecting evils which require his attention. If no complaints are made to him, he finds little occasion to exercise the prerogatives of his office. Again, the health officer who is inefficient, either on account of want of interest, a dilatory disposition, or incompetence, will take no steps in the direction of sanitary reform, or for the benefit of the public health, to which he is not urged by the public sentiment of the section in which he is stationed. Hence it is evident that one of the most effective means of encouraging sanitary enterprises and of rendering successful in the highest degree the efforts of health boards, health officers, and all departments of sanitary work, is the improvement of public sentiment in favor of hygiene and sanitary science. Any organization which promises to effect this is well worthy to receive the encouragement and coöperation of all sanitarians.

4. Organizations of the sort under consideration might be made a very efficient means for collecting knowledge upon subjects of interest and value to sanitarians respecting the causes and communicability of diseases, the best means of preventing disease, and a great variety of other questions. It is quite possible that some information would be gained by an organization consisting of live and intelligent workers, voluntarily engaged in sanitary work and interested from their special liking for or appreciation of the value of the work, which could not be gained so readily through regularly appointed officials. Every member of such an association would become in some sense a health officer—self-appointed,—at least to some considerable degree a sanitary inspector, with opportunities for inspection through careful observation while mingling in social intercourse with his neighbors much better than those enjoyed by the health officer, except when acting in response to a complaint calling for the abatement of some nuisance.

5. It is quite possible that local volunteer sanitary organizations might be usefully and successfully employed for the correction of evils, which, although they seriously threaten the public health, are yet of a character very difficult to reach by legislation. The patent evils arising from the unrestricted operations of incompetent persons as physicians and druggists may be mentioned as of this class. The terrible evils of quackery are apparent to all, and it is evident that some remedy should be devised; but the subject is of so delicate a nature, requiring such careful and discreet management in order to avoid doing injustice to any one while properly curtailing the operations of quacks and charlatans, that with rare exceptions, no action is taken toward the correction of the evil. The same may be said respecting the incompetency of druggists and druggists' clerks, to the mistakes of whom the loss of many lives is annually attributable. It is not claimed that sanitary protection associations or any other organizations would wholly correct these stupendous evils; but it

seems very probable that much might be done in this direction by such organizations. This would certainly be the case should the suggestions made by Dr. Milton Chase, in a recent Report of this Board,* respecting the best manner of settling the quack question, be adopted by the law-making power of the different States, where efficient laws regulating these evils are not already in force; the plan suggested requiring each physician to register his name at a given place and time, together with the evidence of his claims to the confidence of the people as a thoroughly educated physician, so that any one who desired to do so could readily ascertain the professional standing of any or each of the physicians practicing in his vicinity. If many persons in each community were associated together for the purpose of promoting health, information of this character would readily be communicated to a large number, so that, being amply warned of danger from this source, the people would themselves soon correct the evil, by refusing to patronize persons who were known to be ignorant, incompetent, and unreliable.

6. Lastly, it may be urged in favor of these organizations that they are approved and highly recommended by eminent sanitarians in this country and elsewhere; as, also, that the results obtained by the Newport and Lynn Societies are such as to recommend the plan to other cities and villages. Associations of this sort were also recommended by the committee on general sanitation appointed by the Sanitary Council of the Mississippi Valley. The excellent work which has been done by the New Orleans Auxiliary Sanitary Association should be mentioned as evidence of the value of this class of sanitary organizations. The valuable results obtained through the efforts of the Tottenham Association are also worthy of notice here. Through the influence of this association a thorough reformation of the drainage and water-supply of the place was effected, together with an abatement of numerous nuisances. The effect of these improvements was to diminish the deaths from fever more than seventy-five per cent, to cause a very great decrease in the number of deaths from zymotic diseases of all sorts, notwithstanding a very considerable increase in the population, and to bring about an equally marked improvement in the material prosperity of the town.

The greatest difficulties which present themselves as obstacles to the general introduction of sanitary protection associations are, first, a general apathy on the part of the people upon the subject of sanitation; second, the difficulty of finding in every community where an organization would be proper, a sufficient number of men competent to act as officers in such an association. However, both these obstacles will disappear as the people become enlightened on the subject of hygiene, and thus no impediment will be left in the way, and success will be assured wherever the experiment is tried in an energetic and intelligent manner.

A PLAN FOR SANITARY PROTECTION ASSOCIATIONS FOR SMALL TOWNS AND VILLAGES.

The plan of organization adopted at Newport and Lynn, while exactly adapted to the conditions and requirements of those cities, evidently requires some modifications to meet the wants of associations formed in small towns and rural villages, where sewers and, in most cases, even gas, are unknown. The absence of the complicated problems connected with a city sewerage sys-

* Page lvii of the Fifth Annual Report of the Michigan State Board of Health, 1877.

tem and which usually require the services of an expert for their settlement in disputed cases, make room for the consideration of numerous other subjects of great practical interest which will be named in defining the objects of such associations.

It is important that these organizations should be simple as possible in their plan, since the persons who will in most cases constitute the active members will necessarily be men little accustomed to such work.

Objects.

The objects of such an organization should be:—

1. Where local boards of health or health officers already exist, to coöperate with those authorities in the carrying out of such measures as may be adopted for the benefit of the public health.

2. Where local boards of health or health officers do not exist, to perform the work which would devolve upon such authorities, so far as possible, and to secure their appointment at the earliest possible period; and also to secure, if possible, the adoption by municipal authorities of such measures as may be necessary for improving the sanitary condition of the city and preserving the public health.

3. To provide its members and others who may desire, at moderate expense, with such inspection as shall acquaint them with the sanitary condition of their own dwellings and their surroundings, public buildings, and other buildings and premises in which they may be specially interested; also to provide at a minimum cost analyses of such articles of food and of household use as may be suspected of harmful adulterations.

4. To encourage by every proper means an interest in sanitary science among the people, and to diffuse knowledge respecting the nature of disease, its causes, and the best known methods of prevention.

5. To collect useful information on all subjects pertaining to sanitary science and the protection and prolongation of human life.

Membership.

Any person resident in the town or village in which the association is formed shall be eligible to membership, and may become a member by signing the constitution and rules of organization of the association.

Privileges and Duties of Members.

1. Each member shall be entitled to vote in the transaction of all business which shall come before the association.

2. Members shall be entitled to an annual inspection of their dwellings and premises; and also to inspection, at other times, which may be rendered necessary by disease or other cause, at the smallest possible expense which can be made to cover the actual cost of the work done. Members may also call for the inspection of other buildings and premises upon the same terms.

3. Each member should understand that in signing the constitution he pledges himself to coöperate in the most hearty manner possible with the executive committee in carrying into practice the principles of correct sanitation, and to do all in his power to correct such evils or deficiencies as may be pointed out by the inspecting committee. In case of any misunderstanding or disagreement between members and the inspecting committee, or between members themselves, the matter may be referred to the executive committee.

Officers.

The officers of the association should consist of a president, a secretary, a treasurer, and an inspecting committee of two or four members, all of whom should be elected at the annual meeting of the association. The several officers shall together constitute an executive committee.

Duties of Officers.

The president, secretary, and treasurer should perform the duties usually devolving upon such officers.

It should be the duty of the members of the inspecting committee:—

1. To qualify themselves by the study of suitable works upon the subject, if not already competent, to be able to give a correct opinion in all ordinary cases requiring sanitary inspection;

2. To make a sanitary inspection of any dwelling, premises, or public building, or to investigate any nuisance concerning which complaint may be made, when requested by a member of the association;

3. To make a report of the investigations made as soon as possible after receiving a request to make an inspection, to both the person making the request and the secretary of the association, on blanks prepared for the purpose, or in the form of a written statement in case blanks are not furnished;

4. In cases requiring special skill and large experience, to employ a sanitary expert, provided the individual making the request for inspection is willing to incur the necessary expense.

The executive committee shall have general charge of the business of the association, may fill its own vacancies, and should appoint of its own number the following committees:—

1. A committee on the diffusion of sanitary knowledge, whose duty it should be to secure the publication of appropriate articles in the local newspapers, and to arrange for public lectures on appropriate subjects whenever practicable.

2. A committee on analyses, whose duty it should be, *(a.)* To become acquainted with the simpler methods of detecting harmful adulterations or poisoning of food and other articles in common use, such as wall-paper, tin-lined vessels, etc., and such other dangers as threaten life or health through food and drink; *(b.)* To make a careful examination of such articles as may be presented for examination, at the smallest expense to the member presenting the same that will cover the actual cost of the examination; and in case of inability to make a satisfactory examination, to employ an expert to do so, provided the person most interested is willing to meet the necessary expense.

Meetings.

An annual meeting of the association should be held for the election of officers, the time and place being appointed by the executive committee, at which one-third of the membership shall constitute a quorum. Special meetings may be called by the executive committee.

The executive committee shall meet once in three months, at least, and more frequently, when necessary, meetings being called by the president.

Annual Assessment.

An annual assessment should be made sufficient to cover necessary expenses not otherwise provided for, the assessment not to exceed a certain sum, to be specified in the rules of organization.

Amendments.

A provision should be made for the amendment of the foregoing rules, at any meeting of the association, by a two-thirds vote of the members present.

Suggestions.

In the organization of an association of the kind proposed, the first step is always the most difficult one, and will necessarily involve a large amount of unremunerative labor on the part of those who take the initiatory steps; but this is true of nearly all philanthropic enterprises, and should not debar those who are best fitted for the work from engaging in it. Physicians are especially well adapted to lead out in such an enterprise. Their daily intercourse with the people in their homes gives them abundant opportunity to become acquainted with their special needs, and also to enlist the interest of those who may be benefited by such an association. Health officers and correspondents of State Boards of Health are also particularly well adapted to this work.

A good way to call attention to the enterprise would be to secure a public lecture, by a competent person, on some sanitary subject adapted to the wants and comprehension of the people. When this cannot be done a beginning may be made by the publication of articles and the circulation of literature on some important sanitary subject specially adapted to the place or to the season of the year. The occurence of an epidemic of diphtheria, scarlatina, typhoid fever, or some other contagious or infectious disease may be seized upon as a time particularly favorable for the proposal of a Sanitary Association.

It is especially important to enlist the interest and, so far as possible, secure the coöperation of physicians, lawyers, dentists, clergymen, and other professional men. Physicians and clergymen can be of special service through their wide influence with the people. Druggists, if interested, may also be of very great service as analysts.

Respecting the practical working of a local sanitary association as auxiliary to a local board of health, or, in the absence of such an organization, as a substitute for it, it may be remarked that while it is well to accomplish all that can be done for the advancement of sanitary reform, it is unwise to attempt too much, especially at first. The greater evils should be attacked first.

WORK OF COMMITTEES IN A SANITARY ASSOCIATION.

The following hints respecting what points should receive attention from the proper committees of a well-organized and active sanitary association is offered as suggestive of the work which may and should be done:—

1. An examination of the relations to health of the location of the town or village, its surroundings, the character of the soil, the general water-supply, the location of the cemetery, if near, of mill-ponds, or stagnant water of any kind, etc.

2. In the inspection of buildings and premises, the careful examination of the structure of the building, its location, the condition of each part of the building,—if a dwelling, of the cellar, kitchen, store-rooms, closets, bed-chambers, water-closets, garrets, etc.; of gas and water-supply; the kind of paper used on walls; of ventilation and manner of heating; of location and structure of cesspools, of privy, of well and cistern, of back-yard, hog-pen, hen-coop, garbage-heap, and other nuisances when they exist.

3. Examination of water, food, especially pork and other kinds of animal food in the warm season when decomposition is rapid, of cooking-utensils,

clothing, and other articles of common use when the occurrence of disease gives occasion for suspicion of the existence of its cause in any of these.

4. Upon the occurrence of an epidemic the adoption of such means as are available to inform those who are or may be exposed to the influence of the same, of the nature of the prevailing malady, and the best means of avoiding the same.

5. The investigation, so far as feasible, of the causes of fires and of other destructive accidents which may occur, and the preservation of a record of the same when obtainable.

CARE OF PRIVIES.

One of the most glaring evils worthy of a vigorous attack from a local health organization, and one which is everywhere present in towns not provided with a system of water-carriage for sewage, is the privy-system. As managed at the present time, these conveniences are most abominable nuisances and are most seriously dangerous to public health. In many cases a large share of the necessaries in use in a country village, are, from their filthy condition, outrages against decency, to say nothing of sanitary requirements. The fetid, pungent odors which are poured upon the air by such a hot-bed of disease, carry with them the cause of much of the illness with which most communities are visited during the Summer and Autumn.

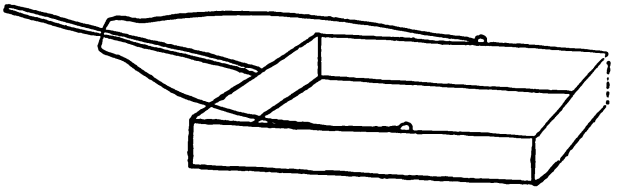
The practical question connected with this subject is, How shall the evil be corrected?

This question has been carefully investigated by a committee appointed for the purpose by the Auxiliary Sanitary Association of New Orleans, a city in which the evils of the system attain the most stupendous proportions. The plan recommended by the committee and endorsed by the association is what is known as the "Rochedale pail-system," which is thus described in the published report of the committee referred to: "It consists of a closet of strong and simple construction, beneath the seat of which is placed a 'pail,' made from half a kerosene barrel, capable of holding one hundred pounds; but in fact the average weight of its contents, after a week's use by an ordinary family, proved to be forty-one pounds. This is removed weekly, and an empty, disinfected pail substituted. In the case of very large families, two or more pails are used, or the removal is made twice or thrice a week. At the time of removal a tight-fitting metal lid is placed upon the pail. The process is quite inoffensive, and is systematically performed."

A SUCCESSFUL TRIAL OF THE PAIL-SYSTEM.

In the spring of 1875, I introduced on a small scale a plan similar to that described above into a portion of a small city in this State. About one hundred receptacles were used, which were managed in accordance with the system described. Dry earth and ashes were used to delay decomposition, and a scavenger was employed to empty the receptacles once a week during the months of April, May, June, September, and October. They were regularly emptied twice a week during July and August, and during the most extreme heat every other day. The results of this small effort were very gratifying, the usual amount of summer and autumnal sickness from fevers and other zymotic diseases in the section of the city in which the pans were introduced being greatly lessened. The receptacles employed at that time were shallow pans about two feet square and four inches deep, made of heavy sheet-iron, and costing about sixty cents each. The following is an outline representation which will show its form.

FIG. 1.

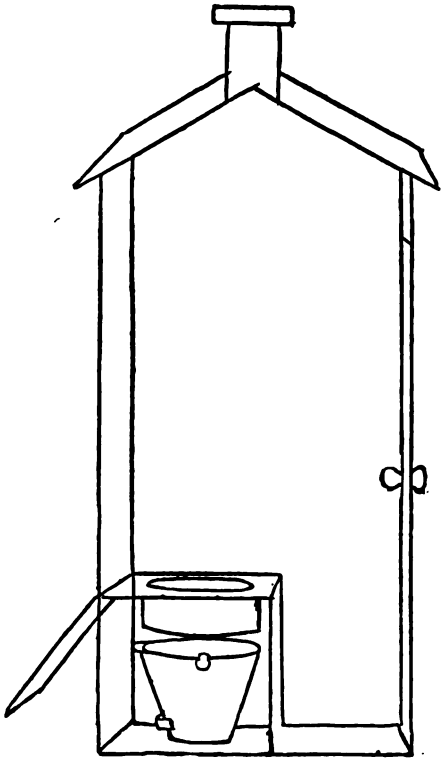


Pan for Dry-Earth Closet.

It was found that the constant contact of a greater or less quantity of fluid excreta occasioned so rapid corrosion of the iron that the pans were rendered useless after one season's use on account of leakage, so that the system was not continued by all who at first engaged in it, though many provided themselves with galvanized pans which were more durable, and a few made large tubs by dividing kerosene oil barrels, to which a long stout handle was attached, by means of which they were drawn out to be emptied and replaced.

The present season another effort was made in the same community to introduce the "pail system," most of the pans being worn out or abandoned for want of appreciation of their value. Though the effort was made quite late in the season, owing to inability to give the matter attention earlier, a large number of pails were introduced, the form and mode of using which will be clearly seen by the accompanying diagram.

FIG. 2.



Pail for Earth-Closet, in Position for Use.

The size of the pails used is 12x15 inches at the top, 9 inches at the bottom, and ten inches in depth. They are made of heavy galvanized iron, and are very strong, and cost 50 cents each with the collar which is attached to the seat to prevent the scattering of excreta upon the ground. The width of the collar is varied somewhat according to the distance from the seat to the pail, this provision being made to accommodate the plan as much as possible to the form of construction found in most privy-buildings. The pail rests upon a plain board upon which are fastened guides which direct the pail to the proper position beneath the center of the opening in the privy-seat.

The pails are managed upon the same plan as were the pans, and prove in every way much more satisfactory, being more durable and much more convenient for handling by the scavenger. The cost of caring for privies by this system is very small. The original cost is a mere trifle, and where a hundred pails or more are in use the expense for a scavenger need not be over five cents a week for each.

The pails can be used in cold weather as well as in the warm months, as they can be placed in the woodshed or other convenient place in connection with a proper closet, which can be easily constructed, as described in another paper in this Report by Dr. H. O. Hitchcock, entitled "Depot Privies."

Much other important work will readily be found by those who are interested in sanitary reform; and those who will engage in it with vigor and earnestness will be amply repaid for their efforts, by the beneficent results which are certain to follow wherever efficient sanitary work is performed.

MASSACHUSETTS PUBLIC HEALTH ASSOCIATION.

Since the foregoing was in print, I have seen a paper read before the American Social Science Association, in Boston, January 8, 1879, by Mr. George T. Angell, entitled "Public Health Associations," in which the author sets forth the danger to health from adulterations of foods, liquors, drugs, medicines, from various poisons used in the manufacture of cooking-utensils, articles of clothing, and other articles in common use; and the danger to property and life from the use of low-grade kerosene, and strongly urges the formation of voluntary "Public Health Associations" as a means of guarding against these dangers. The paper has called forth considerable criticism, and prominent persons have decried the dangers pointed out; but it has led to the formation of an association incorporated as the "Massachusetts Public Health Association," of which Dr. Bowditch, President of the Massachusetts State Board of Health, Edward Everett Hale, and other leading men of the State are members. While there is room for such a State organization, there is still an urgent need for local associations. Indeed, an important part of the work of a State association would be to secure the formation of local associations, and so coöperate with them as to secure through them the largest and best possible results.

THE LADIES' SANITARY ASSOCIATION OF LONDON.

I have also learned of the existence, in London, of a woman's sanitary organization, called the "Ladies' Sanitary Association," which has done a grand work in the dissemination of sanitary knowledge, especially among the poor of London. The secretary of the association is Miss Rose Adams; the office is at 22 Berners street. The following reference to its work, in the London "*Punch*," of January 5, 1878, seems worthy of insertion here:—

"In 1857, a few wise women, impressed by a sense of the wide-spread ignorance of the laws of health, and the vast amount of preventable illness and death thence arising, set to work to get together and circulate plain knowledge on the subject. Some wise men helped the wise women. They began with Lectures to Ladies, and went on with Tracts. Never was a more praiseworthy or helpworthy tractarian movement than that which sprang from the 'Ladies' Sanitary Association,' in words of wisdom on *The Worth of Fresh Air*, *The Use of Pure Water*, *The Value of Good Food*, *How to Nurse the Sick*, *The Health of Mothers*, *How to Clothe and Manage a Baby*, *The Power of Soap and Water*, &c., &c., &c., and other such 'homely' truths, which have circulated in swarms from their eighty-six thousands to their tens, doing as purifying and sweetening a work as the insects which spread the pollen of the flowers.

"With an average yearly income of £350, the Association has, since 1857, published seventy such tracts, edited by scientific men, but written in simple language. The publications of the Association have had a circulation of nearly two millions, have been translated into several languages, welcomed at hospitals, working-men's clubs,

lending libraries, mothers' meetings, and schools, and distributed by Clergy of all denominations, Scripture Readers, City Missionaries, Sisters of Mercy, Bible Women, and Sanitary Missionaries.

"The paper on *Overwork* served to prepare the way for the 'Early Closing Association.' *The Dance of Death* helped to call attention to the use of arsenic in ball-dresses, flowers, and wall-papers. *Dress and its Cost* pleaded not unsuccessfully for over-tasked seamstresses, working weary hours in ill-ventilated rooms, and from the same source came the present effort to obtain seats for shop-women, who suffer so much by long hours of standing behind counters, which is procuring relief for them steadily, though slowly.

"The delivery of practical lectures on health, sanitary improvements, and domestic economy, formed another principal feature in the Ladies' crusade. Some seventy courses have been delivered on physiology, public health, gymnastics, chemistry cooking, and nursing. Branch associations have been formed, day nurseries have been opened, houses cleaned, cleansing materials lent, clothing clubs formed, and even a company for building suitable dwellings for the poor. Poor London children have been fed, cared for, and made happy in a humble way. Baths, washing-tubs, pails, brooms, and brushes, disinfectants, cooking-utensils, and nursing-appliances, patterns of garments, made and unmade, text-books on domestic economy, models of filters, drain-traps, ventilators, invalid cooking and nursing appliances, have been kept and lent for purposes of illustration.

"The Association has helped to introduce into schools text-books of domestic economy, and in its last tract, *Our Schools and Public Health*, has tried to draw the attention of all engaged in training the young to the importance of teaching physiology and the laws of health.

"In the face of the needs pressing and the work accomplished, the Association may fairly take credit, in its own words, for having labored, 'by God's blessing, to secure happier, purer, more intelligently managed homes for England, and healthier, more temperate, truer manhood and womanhood for her sons and daughters.' *Punch*, at this Christmas-tide, can have no fitter function than to point to what these Ladies have done, and to ask all his Lady readers not only to wish well to, but to join and aid their wise and kindly efforts."

It is easy to see that such local sanitary associations as have been outlined in this paper, coöperating with the State Board of Health would form another efficient means of mutual communication between the people and the Board, and would thereby not only put a greater number of people throughout the State in possession of the results attained through the work of the Board, but also materially increase the value of those results.

J. H. KELLOGG.

WASTE OF HUMAN LIFE.

A COMMUNICATION

RELATIVE TO

The Falling of the Grand Stand at the Lenawee County Fair,

AT ADRIAN, MICH., OCT. 2, 1879;

AND TO

THE WRECKING OF THE PACIFIC EXPRESS,

NEAR JACKSON, MICH., OCT. 9, 1879.

BY PROF. R. C. KEDZIE, OF LANSING,

PRESIDENT OF THE MICHIGAN

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON POISONS, EXPLOSIVES, CHEMICALS, ACCIDENTS, AND SPECIAL SOURCES OF DANGER TO LIFE AND HEALTH.

PRESENTED TO THE BOARD AT ITS REGULAR QUARTERLY MEETING, OCT. 14, 1879.

WASTE OF HUMAN LIFE.

A COMMUNICATION BY THE PRESIDENT OF THE STATE BOARD OF HEALTH AT ITS REGULAR QUARTERLY MEETING, OCTOBER 14, 1879.

Since the last meeting of this Board two accidents have occurred in this State attended by such a loss of life and injury of person, that I have thought it proper to bring them to your attention. The law says, "The State Board of Health shall have the general supervision of the interests of the health and life of the citizens of this State." When we consider our duties as defined by the law, and when we remember the wholesale homicides at Adrian and Jackson, by which thirty-one persons were killed outright, and some two hundred and fifty were so seriously injured as to require surgical treatment, we should be derelict in our duty as a Board to pass by in silence such frightful occurrences.

THE CALAMITY AT ADRIAN.

On the 2d instant the grand-stand at the horse-races of the Lenawee County Agricultural Fair, fell with a crash when some 2,000 persons were in the building, killing ten, and wounding between two and three hundred, six of whom have since died; and it is probable that others are so seriously injured that recovery is not to be expected. Many of those who have escaped death are yet crippled for life, while the suffering from personal injury, fright, and anxiety for safety of friends is beyond human computation. If a band of Ute warriors had dashed into Adrian, the number of killed and wounded would hardly have been greater than by this cheaply-built but effective *dead-fall.*

The owner, according to the published accounts, seems to have given his chief attention how to make the building as cheap as possible; the architect seems to have known nothing about architecture or the strength of materials, and was incapable of copying a building already erected; while the man who built this man-trap did not rise to the level of an ordinary carpenter. Yet to such a trinity of greed and folly the Executive Committee of the Lenawee County Agricultural Society entrusted the lives of 2,000 of their citizens.

And when this wretched structure fell, the basement contained ploughs and buggies, on the broken fragments of which many were impaled who had escaped the falling timbers.

It is a misuse of words to call this an accident, for if any one had used *sight*, to say nothing of *foresight*, they must have seen that the most natural and necessary thing such a structure could do would be to fall when loaded with 150 tons' weight of any kind.

We hear of the horror and remorse which fill the souls of those who are responsible for this terrible wrong, but the dead come not back in response to tears and groans and wringing hands; nor are the days and months of weary agony of the wounded alleviated by these tokens of repentance. I do not utter these words to intensify the deep indignation which pervades this State over this occurrence. What I demand is, that our hot indignation shall not cool off into pity and weak sentiment, to leave the public unprotected against the recurrence of such wholesale slaughter.

THE JACKSON CALAMITY.

The Pacific express, on the Michigan Central Railway, leaving Detroit in the evening of October 9, was delayed for various reasons so that it was about 45 minutes late; but the engineer, by rapid driving, was making up for lost time, so that when the train entered the Junction, two miles east of Jackson, it had recovered part of its lost time. As it entered the Junction at a high rate of speed, it encountered a freight train on the main line; and although the engine was reversed and brakes applied, the ill-starred Pacific express collided with the freight train with such violence as to wreck both trains, fifteen persons being killed and some thirty-five wounded on the express train, while every person connected with the freight train and with the Junction escaped injury.

The Post and Tribune published an abstract of the testimony of the persons employed at the yard and on the freight train, from which it appears that all the parties concerned—the yard-master, the manager of the switch-engine, the fireman, the switchmen, and the telegraph operator—all knew that the Pacific express was over-due, and yet, without knowing how soon the over-due train would arrive, without placing any one at the curve to signal the approach of this train, but with a stupid, blundering *guess* that they had sufficient time to transfer some freight cars from north to south side of the yard, the freight train was moved down on to the main line only to encounter the express train! Could human folly exceed this? Yet this was done apparently with the concurrence of all the officials and employés at this station; and in such hands is placed the safety of the traveling public! Nay, more! two witnesses testify that the yard-master is intemperate, and he himself confessed that he had taken "one or two glasses of brandy" the day he appeared before the railroad managers, but said he did not drink any liquor the day of the accident.

It is a matter worthy of note that the parties who contrived and erected the man-trap at Adrian all escaped injury; and that those who caused the wreck and wholesale manslaughter at Jackson skipped out of the danger, while the engineer and fireman of the Pacific express bravely met death at the post of duty.

You all remember the disaster at Muir, on the Detroit & Milwaukee Rail-

road, six years ago, when a freight train ran into the rear of a disabled passenger train, killing and wounding a number of passengers. A flagman was sent back to signal and stop the freight-train; but the night was dark and disagreeable, and the flagman only went about a quarter of a mile, and there waited for the train; but the train was unable to stop at so short notice, as it was down-grade, and the rails were wet and slippery, and hence the freight train ran into the rear of the passenger train, with the results already stated. Some one remonstrated with the flagman when he stopped to wait for the train that the distance was too short, that he ought to go up farther to signal the train; but he insolently answered, "Who is doing this flagging?" and refused to go any farther. When the collision occurred, and five or six persons were killed and a greater number seriously wounded, this flagman skipped lightly over to Canada and escaped all punishment for his crime.

At the time this disaster occurred at Muir, the Constitutional Commission was in session in Lansing; some members of this Board drew up and presented a memorial, asking that some constitutional provision be inserted in our State constitution by which greater protection might be thrown around persons who travel by public conveyance of any kind, by steamboats, railroads, coaches, etc. A proposition was made by a member of the Commission to make the stockholders liable to heavy damages for the loss of life or injury of person resulting from the carelessness or neglect of any of their employés, etc., but this was finally rejected.

What is the duty of the State Board of Health with reference to such deplorable occurrences? I ask this question without any expectation of fully answering it myself, but chiefly to draw out the opinions of the Board. The coroner's jury is investigating all the circumstances connected with the disaster at Adrian, and another jury is doing similar duty at Jackson. These juries are composed of men of unusual intelligence, and they evince a wholesome disposition to go to the bottom of the matter. It would be futile for us to attempt to go over the same ground, or to supplement their investigations.

One fact has struck me very forcibly, namely, that however terrible the accident, or however many may be killed or mutilated, no person is ever punished for the accident except the innocent sufferers themselves. The usual verdict of the coroner's jury is, "No one to blame." A great many so-called accidents have occurred in this country, and very many of them preventable or avoidable by the use of ordinary prudence on the part of officials and employés; yet where is the man who has been hung, imprisoned, or even fined for such slaughter of human beings? The only person of this class who had justice in any form meted out to him was an employé on the Boston & Maine Railroad, and I am not certain that he did not escape punishment at last. It is to be hoped that a roused and indignant public will not permit these recent offenders to go unwhipped of justice.

The question of the first importance is in regard to our laws in reference to the responsibility, both pecuniary and criminal, of those through whose acts or neglects such calamities may occur. Do our laws throw all necessary protection around the lives of persons in public buildings and places, or when traveling in any public conveyance? Are our laws sufficiently explicit to secure the punishment on conviction of any or all the parties whose acts or neglects have caused either of the two great calamities which now demand redress in the

present and prevention in the future? I ask that this whole subject be referred to the Committee on Legislation in the Interests of Public Health, to report at some future meeting of the Board, and to recommend such legislation as may be needed for the public safety.*

R. C. KEDZIE.

LANSING, Oct. 14, 1879.

* [This communication was accepted with thanks, and ordered to be printed in the Annual Report; it was also referred to the committee on legislation in the interests of public health, to report at some future meeting of the Board whether any additional legislation is required to more effectually guard the public safety, and in case the committee should deem any additional legislation requisite, to prepare a bill containing the provisions necessary to this purpose.—H. B. B., Sec.]

REPORT OF THE COMMITTEE

ON

EPIDEMIC, ENDEMIC, AND CONTAGIOUS DISEASES,

RELATING TO

COMMUNICATIONS REFERRED TO THE COMMITTEE, BY RESOLUTION OF THE BOARD, FROM JANUARY 21 TO OCTOBER 8, 1879,

MADE TO THE

STATE BOARD OF HEALTH,

AT ITS REGULAR QUARTERLY MEETING, OCTOBER 14, 1879.

—BY—

HOMER O. HITCHCOCK, M. D.,

OF KALAMAZOO, MICHIGAN,

MEMBER OF THE BOARD, AND ITS COMMITTEE ON THIS SUBJECT.

REPORT OF COMMITTEE ON EPIDEMIC, ENDEMIC, AND CONTAGIOUS DISEASES.

This report will be based only on the papers and communications which have been referred to the committee under a recent resolution of the Board. A far more exhaustive and, it seems to me, useful report could have been made had it been based upon all the facts pertaining to such diseases contained in the reports of the various health officers of the State, and the communications of the correspondents of the Board, could they have been properly compiled; and we would recommend that in future all such facts as have reference to, or bearing upon, epidemic, endemic, or contagious diseases, contained in the reports of health officers or communications of correspondents, be properly compiled in the office and put into the hands of the proper committee as a basis for his annual report.*

I.—DIPHTHERIA.

The following communications relating to Diphtheria have been referred to the committee:—

1. A report by E. N. Palmer, M. D., of Brooklyn, Mich., as health officer, for 1878, of Columbia township, Jackson county. This report shows that for 1878 there occurred in this township, in the practice of Dr. Palmer, Dr. Will Hyndman, Dr. J. A. Porter, and Dr. S. R. Cook, 67 cases of diphtheria, and two cases of scarlet fever. Of the diphtheria cases, 11 died and 56 are reported as "living." Both cases of scarlet fever are reported as "living." This report was dated Brooklyn, Jan. 10, 1879.

2. In the month of December, 1878, Dr. Palmer sent to the Secretary of this Board a communication, "*as to the cases presenting very curious symptoms, entirely unlike those usually observed.*" The cases reported in this paper are all of so much interest that we incorporate the paper as a part of this report.

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*Under present methods, very much relating to this subject is published in separate articles, compiled and prepared under the direction of the Secretary of the Board, as, for instance, the article in this volume on the "Diseases in Michigan in 1878," also the one entitled "Weekly Reports of Diseases in Michigan in 1878,"—the first named being a careful compilation of replies by the regular correspondents of the Board, the last named article being a compilation of reports made weekly by health officers of cities, and by those correspondents who consent to act for this purpose as observers of diseases; both of these articles include editorial notes and comments by the Secretary of the Board, under whose direction the material has been collected.

CASES OF DIPHTHERIA PRESENTING CURIOUS AND UNUSUAL SYMPTOMS; REPORTED BY

E. N. PALMER, M. D.,
OF BROOKLYN, MICH.

BROOKLYN, JACKSON CO., MICH., December, 1878.

Henry B. Baker, Lansing, Secretary State Board of Health:

DEAR DOCTOR:—In reply to your request of December 17, I transmit the following. As to the cases "presenting very curious symptoms, entirely unlike those usually observed," I leave for you to judge, although to me the symptoms, with the exception of the extreme offensiveness and swelling, and in some cases its malignancy, were alike those cases that I have treated in previous years.

The cases of the disease could be easily separated into the divisions some authority (I have forgotten who) has given, namely: simple, croupous, ulcerative, and malignant.

Fatal Cases.

Case 1.—Myra C., aged 6 years. Taken sick October 15. Saw her the next day at 3 P. M. Symptoms: high fever, pulse 128, membrane covering her throat completely; her nostrils, also, were filled full. The membrane was then of a yellowish color. The disease continued about the same until Oct. 18, when swelling of the glands began to increase rapidly; also signs of great prostration; temperature sank from 102½° to 98½° (F.) in axilla; some albuminuria. Oct. 19, temperature 98½°; albumen increased largely; pulse 140, feeble; profuse nosebleed. Oct. 20, temperature 98°, suppression of urine, pulse 38, extremities cold, membrane all, or nearly all, sloughed off, profuse capillary bleeding from entire surface of the throat. Oct. 21, same symptoms continued, and she died at 6 P. M.

Case 2.—Della C., aged 12, scrofulous parentage, not well fed or properly clothed. Taken sick Oct. 30. Symptoms: high fever, delirious, temperature 101½°, glands of the neck swollen, pulse 120, membrane only on one tonsil. The disease pursued its usual course, the membrane all disappearing upon the 6th day. Dismissed the case on the 7th day, as I found her sitting up in a chair sewing. The next day was called to see another case in the same family; found Della complaining of swelling of glands outside of throat; made examination inside and found membrane reappearing, fever returned, temperature 103½°, pulse 120. The next day some albumen in urine, temperature 101°, pulse 90, swelling of the glands increased, membrane all over her throat, some sanious discharge from nose, and slight vomiting, great thirst. This state of things continued, with the exception of gradual reduction of temperature and slowing of the pulse, until the third day after, when her temperature was 97½°, her pulse 36, vomiting constant, membrane gone leaving ragged ulcers, which, in the course of a day or two, left quite large cavities,—one nearly through to the skin. This state of things continued without much change until the 18th day, when her extremities became cold, no pulse at the elbow. She died on the 19th day, keeping her strength to the last, getting out of bed, without assistance, five minutes before she died.

Case 3.—Johnnie S., aged 9, scrofulous, asthmatic, weak constitution. Taken sick Nov. 21, malignant from outset. On the 7th day membrane had disappeared from throat and nose, but bloody, offensive discharge continued for some days after. The glands of the neck, which up to this had been considerably swollen, now began to swell more, and a slight, hacking cough began to show itself. At this time he continued to eat well, and there was nothing to indicate a fatal result except the condition of the neck. On the 9th day I found his pulse suddenly lowered from 108 to 45, with occasional intermissions of a beat. Not being satisfied with the hired nurse (his mother was confined on the 7th day of his sickness), I remained with him all night myself, and left him the next morning with pulse at 80, and to all appearances improving. At 3 P. M. sent for in haste, the boy said to be dying. Found him in a state of syncope. Stimulants, until ether was tried and had no effect; the heart would beat occasionally; used galvanic battery, one pole over the heart and the other to the nape of the neck. In the course of fifteen minutes heart began to act more regularly, and after a few doses of belladona and musk, his pulse beat regular at 42. From this time on he began to improve, and continued to do so for seven days, when the powers of life began to fail, and he died on the nineteenth day of his sickness.

Case 4.—Clarence Shuart, aged 6, a strong, healthy child, a cousin of case 1. Tonsils somewhat enlarged. Taken sick Nov. 21; amount of membrane not very large, extending only over tonsils; fever quite high, temperature 102½°, pulse 148, no vomiting, glands swollen slightly. The 3d day membrane all disappeared, child up

and bright, no fever, pulse 120, temperature 100°. The 4th day did not see him until 10 P. M.; appeared improving, except slight stridulous breathing. The stethoscope gave negative results, but asked for counsel. The 5th day revealed membrane in larynx and trachea. The 6th day Dr. Hyndman, of Norvell, was called in counsel. The 7th day he died from suffocation. No albumen in urine from beginning to end.

Query: What was the difference between this case and one of pseudo-membranous croup?

Case 5.—Ida S., sister of case 3, aged 11. Taken Nov. 27. Saw her first at 6 A. M. (having been at the house all night); glands swollen slightly, no fever, two minute patches of membrane, one on each tonsil, about the size of a millet seed, pulse 88, tongue slightly coated. Saw her again at 10 A. M., only 4 hours after; membrane thick, opaque, and extending nearly over the entire throat, and appearing also in the nose; temperature 102½°, pulse 130, headache, vomiting severe. By the 3d day bloody discharge from throat and nose; 4th day albumen present; glands had continued to enlarge, face swollen, discharge from eyes and ears in addition; 5th day patches of membrane on the face to the number of 7; the roof of mouth all covered with membrane. This state of things continued until her death, which occurred on the 8th day, except that the membrane on her throat sloughed off on the 6th day so that she could swallow and breathe easily. When she died she had her strength and consciousness fully, sitting up without assistance, taking a dose of medicine, and instantly dropped on to the pillow dead.

This ends the list of my fatal cases out of thirty-four treated during the epidemic. Some of the cases that recovered, at the outset appeared to be as bad as any of these reported, except that none of them had the croupous form. In my opinion if a person has that form of the disease you might just as well send for the undertaker and have him prepare a coffin at once. I have never known a case of that kind to recover, with or without tracheotomy; and I think that operation unjustifiable in diphtheria in every case.

Very respectfully,

E. N. PALMER,

Health Officer of Township of Columbia, Jackson Co.

3. A third communication, in reply to some inquiries made by Dr. Baker, is as follows:—

CONTAGIOUSNESS OF DIPHTHERIA, SANITARY SURROUNDINGS OF FAMILIES IN WHICH IT OCCURRED, AND ITS PERIOD OF INCUBATION,—COMMUNICATION FROM

E. N. PALMER, M. D.,

OF BROOKLYN, MICH.

BROOKLYN, January, 1879.

Henry B. Baker, Secretary State Board of Health:

DEAR DOCTOR:—Your communication of January 4, 1879, relative to diphtheria, its source, etc., is at hand. In reply I would say that in our epidemic here I have taken great pains to ascertain: FIRST, *As to its contagiousness;* SECOND, *As to bad sanitary surroundings;* THIRD, *The period of incubation.* I beg leave to transmit the following, putting in only those cases that bear particularly on the above questions.

FIRST SERIES OF CASES.

(*Family of Stephen Rice, Township of Norvell.*)

Locality.—On a high, gravelly knoll.

House.—Old; exposure to winds from any direction; no shade-trees. No history of diphtheria. The family had lived in the house for ten or more years; family clean and neat; cellar in good condition, except a small keg of "soap-grease." No disinfectants used; sink in back room, with outlet into a hole dug in the ground just outoutside the house, on south-west corner, and filled with stones; sink nearly full of slops, and on removing the surface of the ground over the hole on the outside of the house the water (very offensive) oozed out.

Drinking-water, good.

Privy, 80 feet from house.

In a bedroom in southwest corner of house, and in second story, *directly over* the cess-pool before mentioned, slept Fletcher, aged 13, and Charles, aged 15.

Persons sick.—(*Case 1.*) Fletcher R., aged 13 years; attacked July 20, 1878, with diphtheria, croupous form. Duration, 8 days; termination, fatal.

Concerning Contagion.—No exposure anywhere, as far as could be ascertained.

Additional Cases.—(*Cases 2 and 3.*) Charlie R., aged 15, and Ada R., aged 5; taken sick July 28. I saw the two latter July 30, in counsel. Both had the malignant form.

(Advised removing the other two children from the house, which was done, and they escaped having the disease.) Ada died the 5th of August; Charlie recovered. *No public funeral was allowed, and no one was allowed to visit the house, except the nurse and physician.*

SECOND SERIES OF CASES.*

(*Family of —— Knowles, a Farmer.*)

Locality.—Country, 1 mile from "Rice's," due south; soil sandy, but rather low.

House.—Old, but clean; sanitary condition and surroundings good.

Water-supply.—Well, excellent; 20 feet to water; bricked up; platform new and sound; well protected from surface-water.

Privy—100 feet from well, with the dip in the opposite direction.

Persons sick.—(*Case 4.*) Henry, aged 25; attacked August 2, 1878. First symptoms: chill, fever, and vomiting; membrane abundant by second day. Disease ran 7 or 8 days, terminating favorably.

Concerning Contagion.—He had been nowhere where there had been diphtheria that he knew of; but *had conversed several times with the father of the Rice children, while they were sick.*

Additional Cases.—(*Case 5.*) Charles W., who was helping case 4 run a threshing machine when case 4 was taken sick; attacked August 6, 1878. Disease ran 7 or 8 days and terminated favorably. Two children of Geo. K., at whose house case 5 stayed during his sickness, were both taken sick, August 13, with chill, fever, vomiting, and sore throats, the throat being the essential difficulty; but no membrane appeared except a few white spots. Disease ran 6 or 7 days. I did not record them as cases of diphtheria, although I am of the opinion that *that was the difficulty*, and treated them accordingly.

THIRD SERIES OF CASES.*

(*Family of ———.*)

Locality.—Brooklyn village; soil sandy; situation dry.

House.—Old frame house; family had lived in house for ten or fifteen years; cellar good, but *had some decaying vegetables.* No disinfectants had been used previously to the outbreak.

Fuel.—Wood piled near the house; *yard very filthy.*

Water-supply.—Drinking-water from an open well, about twenty feet from house; stoned up, with brick near the bottom; about 20 feet deep; sand all the way down; had not been cleaned in some years; *full* of *débris* that the children had thrown in.

Privy.—Over pit dug in ground; *running over full*, and oozing out on the south side. Had not been cleaned in ten years, or rather not since it had been built; *from twenty to thirty feet from well.*

Persons sick.—(*Cases 6 and 7.*) Milo F., aged 10, and Willis F., aged 8; were not sick enough to need a physician, and recovered in the usual time. (My attention was called to the cases by their father, *but there being no prospect of pay*, I concluded they were not very sick, and *sent* them some medicine.) They were taken sick during the last of September or first of October, 1878.

Concerning Contagion.—When my attention was called to these cases I could not suspect they were derived from contagion; but after some time the father recollected of *conversing a half-hour or more with Mr. Corey, of Kelly's Corners, together with the boys, seated round the stove.* Mr. Corey had been sitting up all the night previous with a case of diphtheria; had laid out the child, and come here, a distance of five miles, to procure a coffin, *without changing his clothes.*

Additional Cases.—(*Case 8.*) Minnie S., aged 8, taken sick October 9, 1878. Had the usual symptoms; disease was quite malignant, but child recovered after some two weeks, with the exception of partial loss of sight, she not being able to read as yet, January 8, 1879. There were *seven cases* following these, of which I have no record, as they were treated by another physician, two in each of the houses adjoining the above, and three directly opposite,—across the street; all children except one; and as the families are unusually intimate, there was *almost constant intermingling of the children.* All recovered.

FOURTH SERIES OF CASES.*

(*Family of P. Cromb, a Farmer.*)

Locality.—Country; soil sandy; situation high and dry.

House.—Frame, new and roomy; everything clean and neat in the house and out of doors.

*[Reported by Dr. Palmer.]

Water-supply.—As good as could be found in the country.

Privy.—New, and at least 200 feet from house or well.

Persons Sick.—(*Case 16.*) Myra Cromb, aged 6. Taken sick October 14, 1878, at school, about 10 A. M., with the usual symptoms of chill, fever, vomiting, etc. She remained in school until 4 P. M., and then went home during a rain-storm, a distance of 1¾ miles. On account of illness I did not see her until 3 P. M. the next day, when the disease exhibited itself in its most malignant form. Disease ran until the 7th day, when she died from blood-poisoning and hemorrhage from throat.

Concerning Contagion.—Ten days previously the *mother and her two children had spent the day at Mr. F.'s* (*Cases 6 and 7.*)

Additional Cases.—(*Cases 17 and 18.*) Ida Cromb, aged 3, and Mrs. Alice Cromb (the mother); taken sick October 18, the mother recovering in the course of ten days, and the child in the course of three weeks, with the exception of some paralysis of the throat and enlargement of the neck glands, which remains to this date. (*Case 19.*) Miss A. Cromb, aged 25 (sister to husband), came there from Clinton to help nurse, October 20, 1878; taken sick October 26 with diphtheria. The disease ran its usual course, and she was able to go home in two weeks.

FIFTH SERIES OF CASES.*

(*Family of W. A. Bartlett, a Farmer.*)

Locality.—About 40 rods from fourth series of cases.

House.—Old, but good; sanitary condition in the house and out of doors very fair; family had lived in house about three weeks.

Water-supply.—Drinking-water, from an old open well, stoned up; not of the best character.

Privy.—Old and full, but too far away from house or well to affect them.

Persons Sick.—(*Case 20.*) A babe 18 months old; attacked October 23, 1878. Symptoms: fever, vomiting, and membrane filling throat and nose; glands of neck swollen badly. The disease abated in the course of eight days, and the child recovered.

Concerning Contagion.—Mrs. Cromb (case 18) went to Mr. B.'s house, October 16, after some hops. *She remained an hour or more, and took the child on her lap.*

Additional Cases.—(*Case 21.*) Daniel Dubois (half-brother), aged 11; attacked November 6, 1878. The disease presented the usual symptoms of malignant diphtheria; ran its usual course, but recovery was somewhat slow, with sequela of paralysis of vocal cords. (*Case 22.*) Charles Knowles, living in same house, aged 30; attacked November 11. The disease ran its usual course, and he recovered.

SIXTH SERIES OF CASES.*

(*Family of E. E. Ferguson, a Farmer.*)

Locality.—Country; low, level, and sandy; exposure, west.

House.—New, brick, well lighted, rooms high and large.

Water-supply.—From shallow well, 7 feet to water; undoubtedly pure.

Privy.—New, made with boxes to draw out and empty; was well disinfected with chloride of lime.

Persons Sick.—(*Cases 23, 24, 25, and 26.*) Harry Hopper, aged 4; Chas. F., aged 10; Feba F., aged 8, and Henry F., aged 12. Case 23 was attacked October 27, and the other three October 29. In these cases the disease was very mild, the membrane cleaning off on the 5th day, and they all recovered without any sequelæ.

Concerning Contagion.—They were *all at school with case 16, and came home the same road for a mile and over together.*

SEVENTH SERIES OF CASES.*

(*Family of James Shuart, a Farmer.*)

Locality.—High and dry; exposure, west.

House.—An old shop re-modeled into a dwelling; two living-rooms and two bedrooms; low between joints.

Water-supply.—From well, open, sixty feet deep; water very good.

Privy.—*Near house, and foul.*

Persons sick.—(*Case 27.*) Clarence S., aged 6; attacked Nov. 21, 1878. Symptoms: Chill, followed by fever; vomiting; sore throat; membrane not very extensive, which cleared off on the 24th, but was succeeded by croupous symptoms, and he died the 28th day of November, 1878.

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*[Reported by Dr. Palmer.]

Concerning contagion.—Cases 17 and 18, Mrs. Cromb and her daughter, had gone to spend the winter from their home to her father's, whose house was just across the road from Jas. Shuart's; and the 8th day previous to his attack *the boy was over there and spent part of the day.* Case 17 had not fully recovered at that time.

Additional cases.—(*Case 28.*) Frank Shuart, aged 3; attacked November 27, 1878. The disease in this case was mild and she made a good recovery.

EIGHTH SERIES OF CASES.*

(*Family of Geo. Collar, a day laborer.*)

Locality.—In village of Brooklyn, next lot north from cases 6 and 7; soil the same.

House.—Very old, windows broken, the house dilapidated generally. No cellar.

Water-supply.—From open well, full of sticks, pieces of boards; about 10 feet from house; *the space between was used for slops.*

Privy.—From 80 to 100 feet from house, but very foul.

Persons sick.—(*Case 29.*) Della Collar, aged 12; attacked October 28, 1878. The case was very malignant, and she died of paralysis of the heart November 15, 1878.

Concerning contagion.—*She had been back and forth and to school every day with cases 6 and 7.*

Additional Cases.—(*Case 30.*) Cora C., aged 9, attacked November 4, 1878. This case was quite malignant, but recovered; was dismissed the 16th day of November, 1878. I find that if I should report all the cases in full that bear upon the points mentioned in your letter, it would take too much space; consequently I change the programme and classify cases, as follows:—

1. CASES APPARENTLY COMMUNICATED BY PERSONS NOT HAVING THE DISEASE.

Libbie King, aged 14, and Maggie Hinshaw, aged 11, pupils in grammar department; both taken with diphtheria November 9, 1878. The first *sat with*, and the other on the seat *directly in front of Nellie Ide, whose brother was sick with diphtheria and had been for ten days previous to the 9th* of November. Nellie was in and out of the sick-room as she pleased, and *was attacked herself about a week later.* There had been no other exposure, and those three were all of the cases in that department, except those who were exposed by direct contact at home.

2. APPARENT COMMUNICATION BY CONVALESCENTS.

Johnnie Sheridan, attacked November 17, 1878; in primary department; sat in seat adjoining cases 6 and 7, before mentioned.

ONE CASE WITH BUT ONE HOUR OR LESS EXPOSURE.

Brayton Wright ate dinner on November 4, 1878, at the house of W. A. Bartlett, (case 20) and was attacked November 11, 1878.

ISOLATION OF CASES.

A few words in regard to isolation, and I close. In the family of Geo. Collar (cases 29 and 30) there were five children. When case 29 was taken sick the other children were removed to another part of the house, with the communication between closed. No person who took care of the sick was allowed with them. Not one more of the children except Cora, case 30, had the disease, and she slept with case 29 the night she was taken sick.

In the Sheridan family, not mentioned here but in my other communication, there were five children. The first case was promptly isolated, and but one more of the children was attacked, and she slept with the other before he was isolated.

May Reynolds, attacked October 23, 1878. There were two younger children in the family that were removed the same day to a neighbor's; in three weeks, after thorough fumigation, they were brought back, and there were no more cases in this family.

Carrie F., aged 30, whom I had employed as a nurse, was attacked December 9, 1878, at home. The younger children were kept in another part of the house, disinfectants were freely used, and no communication was allowed; no further cases in this family.

In families where isolation could not be, or was not effected, *as a rule the children were all attacked with the disease where their ages were not above sixteen years.*

All of which is respectfully submitted.

E. N. PALMER,
Health Officer.

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*[Reported by Dr. Palmer.]

Accompanying this report was a brief statement of the action of the board of health and the health officer, as follows:—

ACTION OF BOARD OF HEALTH AND HEALTH OFFICER OF COLUMBIA TOWNSHIP, JACKSON CO., WITH REFERENCE TO THE ABOVE OUTBREAK OF DIPHTHERIA.

October 16, 1878, the health officer visited every house in the village, and inspected houses, cellars, and yards. To some he gave verbal directions, and of eleven places in the village he made a written complaint to the board of health, with recommendations in regard to them. The board served a notice on each occupant, and the recommendations were mostly carried out. In nine of the places complained of there were cases of diphtheria at that time or before the epidemic ceased. The other two were not occupied by families that had any small children.

On November 15, 1878, at the request of the health officer, the board served a written notice on the director of the school district to close the school forthwith and not allow it to be opened until in the opinion of said board it could be done with safety. From this date there were but two cases that appeared outside of families that then had the disease. One of those was Johnnie Sheridan, before mentioned under the head of "communication by convalescents;" and the other, Bertha Carter, who had been visiting in a family that had had the disease a few weeks before.

On December 9, 1878, they gave permission to have the school opened, with this proviso, "That no scholar should be allowed to attend school from families that then had the disease, and that no pupil who had had the disease within the past 60 days, or who belonged to families where the disease had prevailed during the same length of time, should be allowed to attend without a certificate from the attending physician that the pupil or pupils were in no danger of communicating the disease." Since the ninth of December, 1878, there have been no new cases of the disease in the village, except the Rev. Mr. Eichbaum and wife, who were reported as having it *very light*. As their children did not any of them have it, the report may be questioned. I would say further that there has not been a solitary instance of the disease in Brooklyn or vicinity, among families that took my advice, and kept their children at home and stayed away from it themselves. I attribute the cessation of the epidemic to two or three réasons:—

First, The action of the board of health;

Second, The efforts of the physicians in impressing upon the minds of the people the danger of contagion, and the interdicting, as far as possible, people who had children visiting the sick; and I might probably add a

Third, Burying the dead as soon as possible without a public burial service.

The slight mortality, there being but six deaths in the village, I attribute to the cleanliness of the village and the early use of disinfectants where they were necessary.

All of which is respectfully submitted.

E. N. PALMER,
Health Officer of the Township of Columbia.

4. In April, 1879, the following communication was sent to the office of the Secretary by Dr. C. W. Marvin, of Ithaca, Gratiot county:—

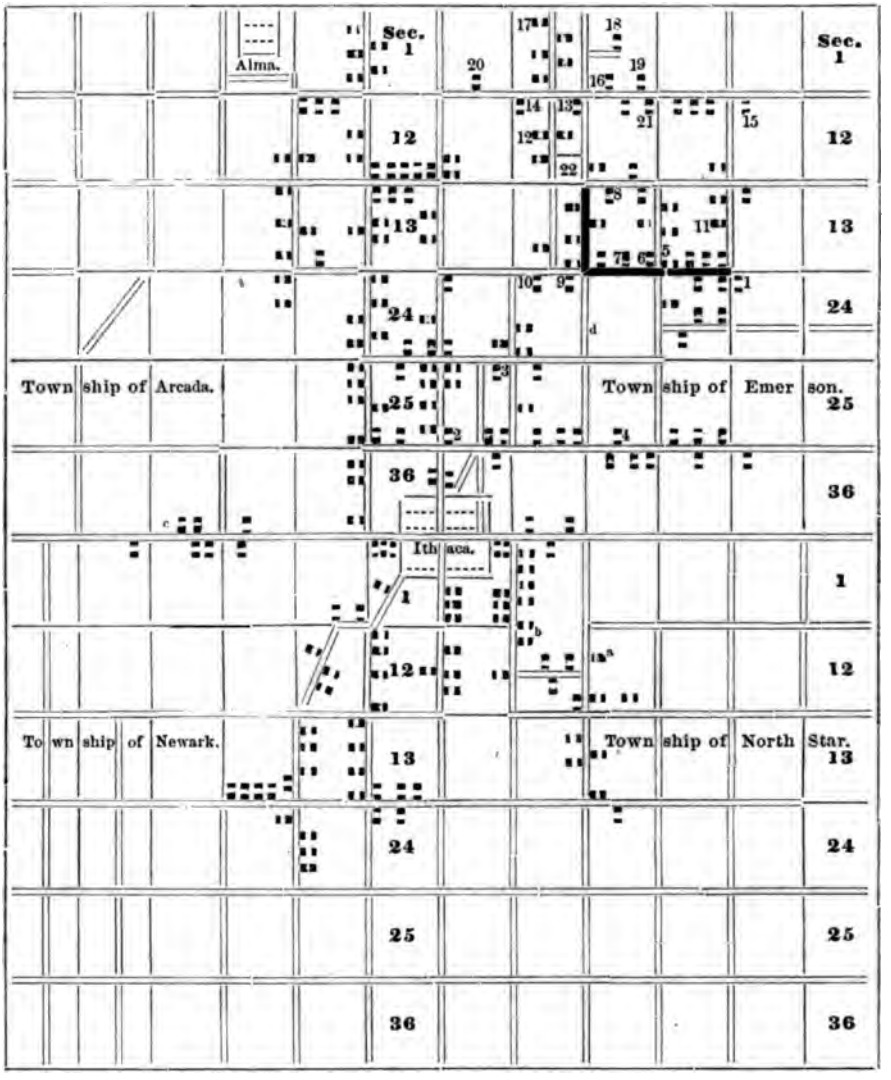
SOME THOUGHTS AND FACTS CONCERNING DIPHTHERIA AS IT PREVAILED IN ITHACA AND VICINITY, GRATIOT COUNTY, MICH., FROM JUNE, 1877, UP TO NOVEMBER, 1878,—REPORTED TO THE STATE BOARD OF HEALTH IN MARCH, 1879, BY

C. W. MARVIN, M. D.,
OF ITHACA, MICH.

Diphtheria appeared in the family of Mr. Bowen, the proprietor of a slaughter-house on section 36 of Arcada, and about 60 rods to the north-west of the village of Ithaca, in the month of June, 1877. Mr. Bowen has quite a family of children, and his being the nearest house to the slaughter-shop the six children were about it considerably. There was no means taken to disinfect the place, the offal falling into a low place behind the shop. From Mr. Bowen's family the disease spread east and south-east. By the 12th of July the disease appeared in some 8 or 10 families in Ithaca, and not over ½ a mile from where first starting; there were some 7 deaths; and by the first of September the disease subsided in Ithaca; and in first part of October diphtheria appeared 1 mile north in one family; and in December there was one case in a family 2 miles north and ½ a mile east, and another case 1 mile north and 2½ miles east of this place.

DIPHTHERIA IN GRATIOT COUNTY.

Map Showing Spread of Diphtheria in Emerson Township, Gratiot County, Michigan, in 1877 and 1878.



No. of House on Map.	Dates of Attack. 1877.	Head of Family.	Persons Sick.
1.—Sept. 5....		Ephraim Heath; daughter, worked in a family in Ithaca where they had diphtheria; died.	
	Sept. 7....	boy attacked; recovered.	
	Sept. 9....	two more cases; recovered.	
2.—Oct. 12-16.		A. J. Brook; 2 cases, girls; recovered.	
3.—Dec. 10....		Ransom Allen; child 2 years old; died; membranous croup, with white patches visible.	
4.—Dec. 21....		Manual Whiting; child 20 months old; died; membranous croup, with white patches visible.	

No. of House on Map.	Dates of Attack. 1878.	Head of Family.	Persons Sick.
5.	June 15	Ramsy; First case in 1878.	
6.	June 20*	George Fauble; 3 cases; one fatal, two recovered.	
7.	Aug.	Acorn (or Eighcorn); 2 cases.	
8.	Aug.	Gregory; 1 death.	
9.	Aug. 16	Herman Shaver; 1 case; recovered.	
10.	Aug. 23	Albert Smith; wife and child.	
11.	Aug.	Jesse Guthery.	
12.	—	Snider; 3 cases, 2 fatal.	
13.	Sept. 12-17	I. W. Greyson; 4 cases; recovered.	
14.	Oct. 1	George Skinner; girl; recovered.	
	Oct. 3	boy; recovered.	
	Oct. 14	self; recovered.	
15.	Oct. 1	W. L. Dougherty; girl; † recovered.	
16.	Oct. 1‡	Jacob Adams; girl; recovered.	
	Oct. 5‡	boy; recovered.	
	Oct. 19‡	wife; recovered.	
17.	Oct. 13	Saterly; boy § and girl.	
	Oct. 13	girl 17 years old.	
18.	Oct. 21	Alfred Anderson; 2 cases; recovered.	
	In 10 days.	2 more cases; recovered.	
19.	Oct. 27	Reuben Brown; boy; † recovered.	
20.	Nov. 9	Oscar Chase; wife (who had often been at No. 14.)	
21.	Nov. 5	Link; 2 cases; recovered.	

No. 22 represents the grave-yard, the route to which, from House No. 1, is indicated by a line, thus ▬▬.

The series of numbers 1-21, placed near the houses, indicate the order of occurrence of the first case at the house to which the number applies. The numbers in larger type, at the right-hand side of each township, state the number of the sections in which they are placed.

Roads are represented by parallel lines, thus ═══.

[a], [b] In another communication, Dr. Marvin states that there were cases at these two houses, of which, however, he knew but little.

[c] In another communication, Dr. Marvin reported cases of diphtheria in four families living west from Ithaca, in the vicinity of this mark; but the identification with houses represented on this map is not certain. The history of the cases was given as follows:—

Family of J. H. Post; caught the disease in another county; 1st case Nov. 9, and 2d case Nov. 11, 1878; both died.

Family of Jacob S. Rogers; caught the disease from the Post family Nov. 13; helped to take care of Post family; 4 cases, recovered.

Family of Alvah Burgess; woman and child at Post's one day and night; both took the disease, the child Nov. 22, and the woman Nov. 24; the woman relapsed twice, and the disease has assumed a chronic character through the winter.

Family of ——; caught disease from Post family; 1 case, died Dec. 1, 1878.

[d] In another communication, Dr. Marvin reported 2 cases in the family of W. R. Johnson, at this point, in July, 1878, one of them fatal.

In September a servant girl carried the disease from this place to her home 3 miles north and 4 east, where a number of children had it, but it did not spread out of the family. In December the disease subsided and did not appear again until the next June, and then it broke out 3 miles north and 3 east of Ithaca, and 1 mile north of where it subsided the fall before. In August and September it went another mile north, and by October appeared another mile north, making 5 miles north of this place; it appeared on an east and west road in nine or ten families, and from 1 to 4 miles east, and disappeared in November 1 mile further north; there were also some cases 2 miles north. The general course of the disease was east of north, but on a

* In another communication, Dr. Marvin speaks of these cases as having occurred in August and September.

† In another communication, Dr. Marvin mentions 2 cases in this family, both of which recovered.

‡ In another communication, Dr. Marvin mentions these cases as having occurred from Sept. 1 to Sept. 22.

§ In another communication, Dr. Marvin states that there were 4 cases in this family.

diverging line as you see by the plat.* The little water courses are all to the east except in the case of the slaughter-house which was to the west. Our prevailing winds are from the south-west. What I wish to note is the disease breaking out each season in the month of June, and appearing the second season a mile north of where it left off the fall before, and spreading on in the same general north-east course, and not a single case west of the starting point, and none south of say about 60 rods of the slaughter-house and these all in the village of Ithaca where it left the village going north-east.

When the diphtheria got into a family *all the children* generally had it and some grown persons.

The disease was diphtheria, the white patches appearing early in the throat and with all the other plain diagnostic symptoms. The disease was more fatal in Ithaca where it first broke out *where the probable cause was more rife.* I have in my mind where the disease was taken out some miles into a family south-east of here, and *there it spread north-east*; also another family west some 3 or 4 miles, that contracted the disease in another county, and *it only spread north-east in that neighborhood.*

The first fall the disease disappeared in December, and last fall it subsided in November, cold weather setting in much earlier in the fall of 1878 than the fall before.

We find that the *materies morbi* of diphtheria is developed by the heat of the latter part of June, and that it takes the frosts of the latter part of fall to destroy it;† that it is wafted by the prevailing winds for one or two miles; that it is very contagious, but has peculiar laws regulating the spreading of the disease that can be taken advantage of to prevent the same. I have submitted this paper to Dr. W. D. Scott and Dr. J. A. Guthrie, both knowing the facts set forth, and they making valuable suggestions to the same.

Very respectfully submitted.

DR. C. W. MARVIN.

5.—To inquiries by Dr. Baker, Dr. Marvin returned the following answers:—

COMMUNICATIONS FROM C. W. MARVIN, M. D., RELATIVE TO SPREAD OF DIPHTHERIA IN EMERSON TOWNSHIP, GRATIOT COUNTY.

The main road north and south is through the center of the county. The four towns that corner here are about equally thickly settled. There is no more travel into the town of Emerson than there is into the town of Arcada; but there was not a case on the west side of the road on the town line, and no cases south of Ithaca. There were a number of cases southeast, but on inquiry they were there before we had any cases here. I have numbered the houses that the disease appeared in. There is full more travel from the south and southwest and southeast to this place than from the towns north. I have not noted any cases in Ithaca on the map I now send, as they occurred in June, July, and August, and before a case appeared in Emerson.*

Now do not mistake that the main roads are off in that direction, or that more people live in that direction; there was every facility for the disease to go other directions than what it did go. What I ask is, Do you find the disease in other parts of the State to observe the same law and spread in some one direction as though the cause was wafted by the prevailing wind? * * * * * * *

The first case at hand, No. 1, had a public funeral at the house, 2 miles from the grave-yard; the road or route to the grave-yard taken by the procession with the body is marked on the plat with a heavy line, thus ▬; the distance may be 20 or 30 rods over 2 miles. * * * Three or four other children of the family had the disease, but recovered. There were no other children at the funeral. The road to the graveyard where the body was taken, was the road on which the disease broke out the next June, but a mile west of that house.

Yours truly,

C. W. MARVIN.

Ithaca, Mich., May 10, 19, and 22, 1878.

6. In October, 1879, the following communication was received from Dr.

* Page 112.

† [The evidence of the weekly reports of diseases received at this office, and of the yearly returns of deaths received at the office of the Secretary of State, is that diphtheria is more prevalent, and causes more deaths, in cold weather than in warm weather.—H. B. B., Sec. S. B. of H.]

Marvin stating that diphtheria had again appeared and northeast from where it prevailed in 1877 and 1878:—

COMMUNICATION FROM DR. MARVIN, RELATIVE TO A NEW OUTBREAK OF DIPHTHERIA IN EMERSON TOWNSHIP, GRATIOT COUNTY.

ITHACA, GRATIOT CO., MICH., Oct. 2, 1879.

Secretary of State Board of Health:

DEAR DOCTOR:—Some months past I communicated with you in relation to diphtheria as it prevailed in Ithaca in 1877, and spread northeast into the township of Emerson, but subsided in December, and again in June last (1878) broke out a mile or so further northeast, and spread in the same general direction, but subsided in October or November of that fall. And now in the fall of 1879 it has broken out a mile or two further on in the same northeastern direction. The first case may have appeared the last week in August. I can hardly make a map of the section where it is prevailing, as it is out of my ride. It appears in the extreme northeast corner of Emerson and the corners of the three other townships cornering there. Can it not be made a special point in collecting the history of diphtheria epidemics to find out in what way they spread: with prevailing winds, or with water-courses? My opinion is winds waft the germs of the disease from one house to another, and that in the winter an epidemic is not as liable to break out as in hot weather.*

Very respectfully,

C. W. MARVIN.

7. In August, 1878, the following communication was received from Dr. Marden Sabin, health officer of Centreville, Michigan, relative to an outbreak of diphtheria in the township of Nottawa, St. Joseph county:—

COMMUNICATION RELATIVE TO AN OUTBREAK OF DIPHTHERIA IN NOTTAWA TOWNSHIP, ST. JOSEPH COUNTY,

FROM MARDEN SABIN, M. D.,

HEALTH OFFICER OF CENTERVILLE, MICH.

CENTREVILLE, MICH., *Aug. 18, 1879.*

Henry B. Baker, Secretary State Board of Health:

DEAR SIR:—Last week an epidemic of diphtheria broke out in our township, about 1½ miles east of our village. During the week ending July 29, our mill race (the location of which with reference to the affected district I have below roughly indicated†), was empty on account of repairs at the mill. An offensive odor came from the pond and race; and, as the prevailing winds were from the south-west, it was most apparent in this neighborhood. Diphtheria has not visited this locality (this village) in several years. Does the empty race account for this epidemic?

MARDEN SABIN.

8. To a letter of inquiry by Dr. Baker, Dr. Sabin made the following replies:—

SECOND COMMUNICATION FROM DR. SABIN, RELATIVE TO DIPHTHERIA IN NOTTAWA TOWNSHIP, ST. JOSEPH COUNTY.

"1. The disease was unmistakably diphtheria.
"2. There was a disagreeable odor from the throat.
"3. There was a false membrane.
"4. There was no possible trace of contagion, except that a family who lived in the house (where the disease first made its appearance of late) *some sixteen years ago had a child die of diphtheria*, and another family living in the same house eight years ago is said to have had a case of the disease.
"5. The distance from *a* to *b* on the diagram is 50 rods; from *a* to *c* 90 rods; from *a* to *d* 130 rods.
"6. From A to B is one and a half miles.
"7. The scale of the diagram is not accurate, but about 2½ inches to the mile.
"8. The prevailing direction of the wind was from the southwest.

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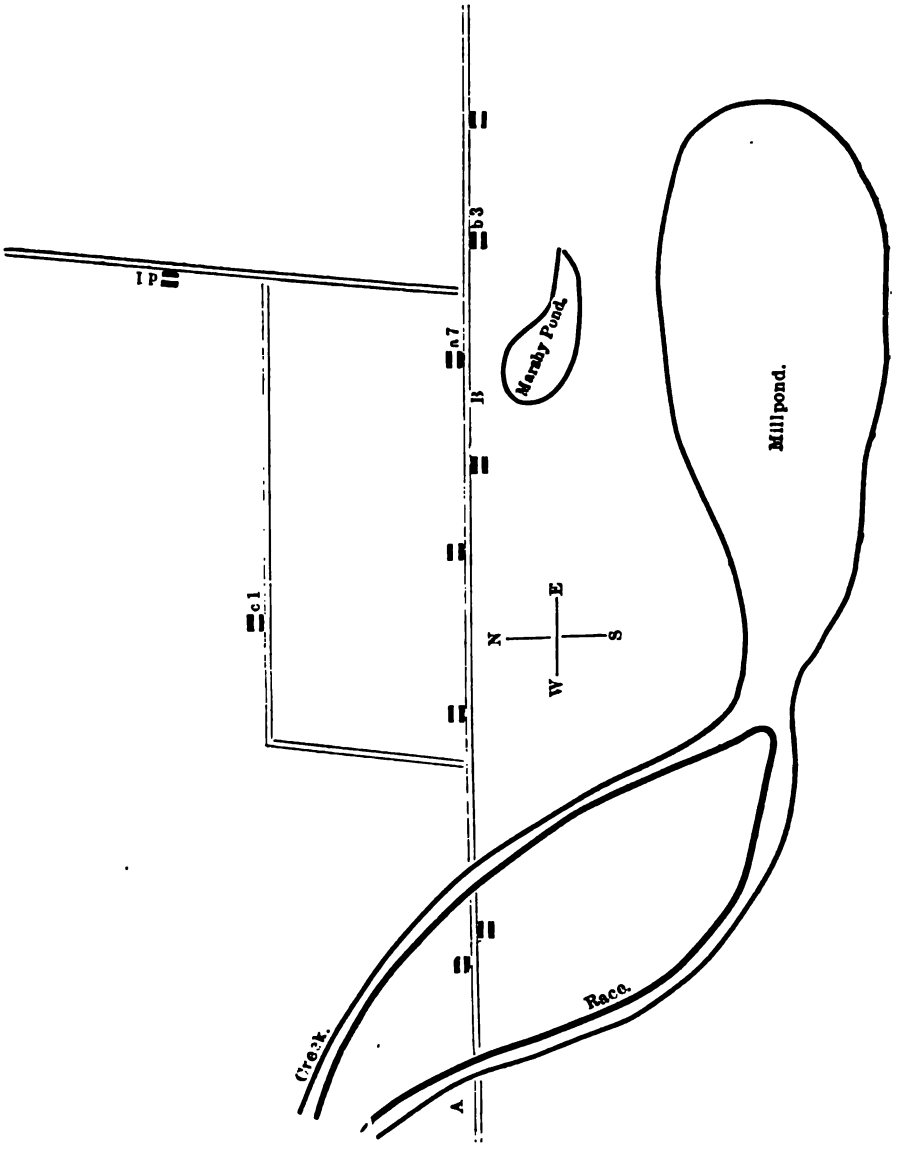
*See dagger foot-note on page 114.

†Page 116.

Outline of Neighborhood Where an Outbreak of Diphtheria Occurred, in Nottawa Township, St. Joseph County, Michigan, in August, 1879.



The letters a, b, c, d indicate the houses where diphtheria occurred, and also the order of occurrence; figures indicate the number of cases.

The distance from A to B is a mile and a half.

The distance from *a* to *b* is 50 rods; from *a* to *c*, 90 rods; from *a* to *d*, 130 rods.

The scale of the map is not accurate, but is about 2¼ inches to the mile.

"P. S.—The physician who treated the cases at *a* calls my attention to the marshy pond at B, and thinks the water in the well at *a* may be affected by that. The cases at *a*, *b*, and *c* were in progress at the same time, and the disease did not seem to be communicated from one to the other.

"MARDEN SABIN."

9. From W. H. H. Knapp, president of the board of health of Riley township, Clinton Co., was received, in December, 1878, the following letter of inquiry relative to the communication of diphtheria and to the prevention and restriction of the disease. A reply to this letter was made by Dr. Baker, the Secretary of the State Board of Health. The reply by Dr. Baker follows immediately after the letter.

INQUIRIES RELATIVE TO THE COMMUNICATION OF DIPHTHERIA AND TO ITS RESTRICTION,—COMMUNICATION FROM

W. H. H. KNAPP,

PRESIDENT OF THE BOARD OF HEALTH OF RILEY TOWNSHIP, CLINTON COUNTY.

DEWITT, MICH., *Dec. 24, 1878.*

Henry B. Baker, Secretary State Board of Health:

DEAR SIR:—In September last I wrote you asking for information with regard to preventing the spread of diphtheria. You replied inclosing proof sheets of a document planned by H. O. Hitchcock, M. D., assisted by other members of the State Board of Health. At the same time you wrote me: "If it does not contain all the information which you desire, please write me again and I will endeavor to give the additional information if possible." Thanks. The paper is able, explicit, and definite on many points; but please excuse me in asking for further information.

Diphtheria still rages in this township, adults as well as children being afflicted with it. One lady, 54 years of age, is now under medical treatment for diphtheria. There have been, among children, 6 deaths since September 1st.

1. Why do some come down with diphtheria 20, and sometimes more than 20 days after exposure?

2. Why do some have diphtheria without any known exposure?

3. Why can many be exposed to diphtheria and not take it? A boy went home from our school in the afternoon, 4 weeks ago, sick, with headache and sore throat; he came in the morning with a bandage around his neck. A physician was called who reported the case to me as diphtheria. The school was closed for two weeks. The boy died; but no other scholar took the disease. In the case of the boy (12 years of age) I understand that before he died the disease was said to be bilious fever, and then hepatitis, or to change from one to the other. Several cases have come under my observation, of exposure at different stages of the disease, where no harm was suffered from the exposure.

4. Inclosed you will find a copy of a notice of regulations made by the board of health of the township of Riley. Would you not advise us to strike out the second regulation?* We made it thinking that if those who had been exposed should come down with the disease while at school or other place where there were children, many others would be infected with the disease from them. Our apprehension, as in the case mentioned above and in others which have come under my observation, seems to be without foundation, besides it puts many to much inconvenience. Any suggestion or information from you will be thankfully received.

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* The regulations read as follows:—

"NOTICE.—The undersigned, Board of Health of the Township of Riley, have, in accordance with sections 3 and 7, chapter 46, of the compiled laws, made the following regulations to restrict and prevent the spread of diphtheria, scarlet fever, and other contagious diseases dangerous to the public health, viz.:—

"1st. That parents, or persons having control of children, prevent their going to places where any person is sick with diphtheria, scarlet fever, or any other contagious disease dangerous to the public health, and prevent, as much as possible, their exposure, in any manner, to any contagious disease dangerous to the public health.

"2d. That parents, or persons having control of children who have been exposed to diphtheria, scarlet fever, or any other contagious disease dangerous to the public health, prevent such children from going to meetings, schools, or any other place where there are children, for the space of 14 days from and after such exposure.

"3d. That parents, or persons having control of children, who are convalescent from diphtheria,

5. Can any person have diphtheria so lightly that he will be around as usual, no treatment being necessary, but still infect others with the disease?

6. Are there remedies which will prevent or mitigate an apprehended attack of diphtheria? If there is any, will you please say what it is?

7. Is diphtheria more dangerous in cold weather than in warm weather?

Respectfully,

W. H. H. KNAPP.

REPLY TO THE PRECEDING LETTER FROM MR. KNAPP, BY HENRY B. BAKER, M. D., SECRETARY OF THE STATE BOARD OF HEALTH.

MICHIGAN STATE BOARD OF HEALTH,
OFFICE OF SECRETARY,
Lansing, February 17, 1879.

W. H. H. Knapp, President Board of Health of Riley Township, Clinton Co., De Witt, Mich.:

DEAR SIR:—Sometime since I promised to take the first opportunity to further reply to your letter of December 24, 1878. I take this first opportunity to do so to the best of my ability, as follows:—

1. "Why do some come down with diphtheria 20, and some more than 20 days after exposure?"

If such cases occur they are probably exceptional, and I do not know why the period of incubation should vary so greatly; but we observe something similar in the postponement of the sprouting of corn and other grains planted in cold unfavorable weather.

2. "Why do some have diphtheria without known exposure?"

There are so many ways in which a contagious or an infectious disease may be communicated, that we ought to expect to meet with many cases that cannot be traced to a previous case. We should remember that each one of the many articles of food may come from a separate locality, and any one of these may have been breathed on by a person suffering with the disease. Nearly every family has a newspaper or a publication, the paper for which comes from a paper-mill, a place well known to be a center for the collection of contagia from small-pox and other contagious diseases. The paper goes through the mails and may be in contact with a letter or wrapper direct from contact with the hand of a person with a contagious disease. The same is true of the different articles of clothing which come through the stores, and particularly of ready-made articles which may have come from the hands of poor sewing-women in houses with children who were having the contagious disease.

3. "Why can many be exposed to diphtheria and not take it?"

Not all seed sown falls on suitable ground, and therefore not all reproduces. Vaccination does not always "take" even when the virus is placed in an abraded skin, because not all are susceptible, for some have been vaccinated before, etc. So we may expect some to take diphtheria, and others similarly exposed not to take diphtheria because of insusceptibility; but in this case, *as I believe*, mainly because of freedom from sore throat. On page 295 of the Report of the Michigan State Board of Health for 1878, you will see that, as a rule, when influenza was very prevalent diphtheria was very prevalent, and when influenza was not very prevalent diphtheria was not very prevalent. This *may* be explained as follows: it may be that they are both contagious diseases, and consequently are both most prevalent in cold weather, as are most contagious diseases; but it may be that only the diphtheria is contagious

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scarlet fever, or any other contagious disease dangerous to the public health, prevent such children from going to schools, meetings, or any other place where there are children, for the space of five days from and after such convalescence, or from and after they are discharged as cured by the attending physician.

"4th. All persons violating the above regulations are liable to prosecution, and penalty not exceeding one hundred dollars.

"5th. That physicians violating the provisions of section 44, chapter 46, of the compiled laws, will be dealt with according to the provisions of section 12, chapter 216.

"RILEY, November 5, 1878.

"W. H. H. KNAPP,
"RICHARD BAYLIS,
"JOHN P. MADDEN,
"JOHN WANDEL,
"L. F. FENTON,
"*Board of Health.*"

and that it is most rapidly and certainly contracted by persons already suffering from influenza or other sore throat, just as vaccination is generally successful only when the virus is placed in a raw or abraded skin. The air we breathe passes the throat, and is likely to deposit there on the first moist surface any dust or germs of disease. If the throat is entirely sound and healthy the contagium, or germ of a disease, may be thrown off without difficulty; but, if there is a raw surface the disease may be contracted. It is possible that this is an important reason why we have more small-pox, diphtheria, scarlet fever, etc., in the cold weather when sore throats are most prevalent. There are, however, other reasons, such as defective ventilation in Winter of most rooms for public assembly, such as schools, lecture-rooms, churches, etc., and the greater frequency in Winter than in Summer of the massing of children in schools, and of others in evening and other meetings.

4. As relates to the following section in your regulations, "2d. That parents or persons having control of children who have been exposed to diphtheria, scarlet fever, or any other contagious disease dangerous to the public health, prevent such children from going to meetings, schools, or any other place where there are children, for the space of 14 days from and after such exposure,"—I would not advise you to strike out such regulation.

5. "Can any person have diphtheria so lightly that he will be around as usual, no treatment being necessary, but still infect others with the disease?"

Yes. See last paragraph on the first page of the document issued by this Board on the Restriction and Prevention of Diphtheria.

6. "Are there any remedies which will prevent or mitigate an apprehended attack of diphtheria? If there is any, will you please say what it is?"

This question is out of the field of work in which the State Board of Health now labors; it is in the field of preventive medicine, but not in that of preventive hygiene or public sanitation. However, I may say that in my opinion there is not yet a well-established preventive medicine of that nature. This makes it all the more important that the disease be restricted.

7. "Is diphtheria more dangerous in cold weather than in warm?"

There are more deaths from diphtheria in Winter than in Summer; but I cannot say yet whether the proportion of deaths to cases in this State is greatest in Winter or in Summer.

If you can communicate any facts relating to the spread of diphtheria, or to better methods for its restriction, statements of such facts will be thankfully received.

I am, sir, very respectfully,

HENRY B. BAKER,
Secretary.

10. From Dr. Milton Chase, of Otsego, Mich., the following communication has been received. It gives a history of eleven cases of diphtheria, tracing an apparent communication from one case to another.

CASES OF DIPHTHERIA IN OTSEGO, ALLEGAN CO., AND SHERIDAN, MONTCALM CO.,—COMMUNICATION FROM

DR. MILTON CHASE,

HEALTH OFFICER OF OTSEGO, MICH.

OTSEGO, MICH., Feb. 13, 1879.

H. B. Baker, Secretary of the State Board of Health:

SIR:—I send you herewith a history of the few cases of diphtheria that have occurred in this town during the past year, and up to this date for the year 1879. September 26, 1878, I was called to the house of Mr. John Willson, who resides on section 2 in this township, to see his son James, about 1½ years old. For two nights and two days they had been doctoring the boy in a domestic way for the croup. After a careful examination I diagnosed laryngitis, croupous or membranous, and treated him for this disease. He died during the evening of the 27th from apnœa. There was no known case of diphtheria about the neighborhood, and the child had not been out of it. No one had come in contact with the child who had recently had it or been where it was within a short time previously. Neighbors of all ages freely visited the patient during his sickness and a public funeral was held at the house. Several children attended this funeral, among the rest the girls of S. J. Dennison, of whom I shall speak hereafter. Within a day or two after the death of James a little brother without name or clothing came to the house to stay. Six or eight days after the death of James, Bertie Willson, a three-year-old brother, was taken sick with

fever and sore throat, and about October 11 Nettie Willson, aged nine years, and George Willson, aged fourteen years, were taken with sickness like that of Bertie. The father, Mr. John Willson, says that they were all sick something like James, Bertie getting quite sick, but the other two were not much sick. Dr. S. W. Thompson, of this village, was called to attend them and called their disease diphtheria. He has not, as yet, reported the cases to the township board of health or to the township health officer. I furnished him and Mr. Willson with blanks for this purpose. I also sent Mr. Willson a copy of the document of the State Board of Health upon Diphtheria. Mr. Willson has not reported these cases as yet, though he says he believed them to have been cases of diphtheria.

Among the visitors at the house of John Willson during the sickness of James Willson, was his half brother, Mr. Otis Willson of Sheridan, Montcalm Co., Mich. He attended the funeral and then went to his home where he had a wife and two small children. About the middle of December, 1878, Mr. John Willson and wife, babe, and son Bertie, the same boy previously referred to, went from here to Ionia and visited with the family of Mr. Willson's brother brother a few days, and then with the brother's wife and another woman drove up to Sheridan to visit with the family of Mr. Otis Willson. About two days after their arrival there, S. J. Willson, a son of Mr. Otis Willson, about 1½ years old, was taken sick. Dr. Moon, of Sheridan, attended the child, and called the case one of diphtheria. It died in a few days. S. J. Dennison, the grand-father of this child, drove the corpse in a sleigh to this town (Otsego), and had it privately buried. A few days after the death of this child a brother, named Elmer Willson, about four years old, had the diphtheria severely and recovered. The father and mother both had the disease lightly. Dr. Moon attended them. There were no known cases about Sheridan recently previously to these, but there have been several since. After the recovery of these Willsons, and about Jan. 10 or 12, they all came to this town and to Mrs. Willson's father, S. J. Dennison. He lives on section 2 in this town, and his farm joins that of Mr. John Willson. Two or three days after the arrival of Mrs. Otis Willson and family at the house of Mr. S. J. Dennison, Miss Arabell Dennison, aged 15 years, was taken sick and in a few days died, Jan. 19, 1879. She was privately buried. The case was called one of diphtheria. Mr. Dennison's house is small, old, and must have been very much crowded during her sickness and death. The deceased had a younger sister Mary who was in the house and with her much of the time during this sickness. Her father and mother also were constantly in attendance. None of these have been reported sick with this disease. As contracted from this case Dr. Thompson reports two cases that had a light attack of this disease. Their names are Nettie Hazeltine, aged 8 years, and George Hazeltine, aged 15 years, both taken sick Jan. 15. The Dennisons made good and reasonable efforts at quarantine, and tried the virtues of carbolic acid as a disinfectant. At this date, Feb. 13, 1879, there are no more cases of diphteria in this township or village. I take it that the history of these cases furnishes some "nuts to crack," if we admit that they were all cases of diphtheria.

First. If James Willson died of diphtheria why did no case spring from it in the neighborhood outside of the house where he sickened and died?

Second. If John Willson and his family carried it to Otis Willson's family in Sheridan, why did they not leave some of it at Ionia. There were children in the family where they visited there.

Third. If Otis Willson's family brought it from Sheridan to the family of S. J. Dennison in this town, was this as great an exposure as it was when S. J. Dennison came from there bringing with him and housing the corpse of S. J. Willson?

Those are questions that every reader, as well as myself, may speculate on, with much curious interest. Laws of contagion as applied to disease and illustrated in these cases seem to be freaky.

I will close this by appending a letter that I wrote to Dr. Moon, and his reply to the same, in regard to the cases in Sheridan.

OTSEGO, MICH., JAN. 24, 1879.

Dr. J. H. Moon, Sheridan, Montcalm Co. Mich.:

SIR:—I am making up an historical report of some cases of diphtheria to send to the State Board of Health. As a part of this report I would like to embody the information that you can give me by answering the following questions:—

First. Had you any knowledge of any cases of diphtheria in your neighborhood prior to the cases that occurred in the family of Mr. Otis Wilson, in December last, that would probably have been the source from which they contracted the disease?

Second. Have there been cases of diphtheria, about you since, that you think could and did have their origin from cases in this family?

Please answer these questions and consider yourself at liberty to make any additional remarks that you may choose.

Respectfully yours,

DR. MILTON CHASE,

Correspondent of the State Board of Health, and Health Officer of Otsego Township and Village.

REPLY TO THE ABOVE, BY J. H. MOON, M. D., OF SHERIDAN, MONTCALM CO.

"DEAR SIR:—I had no knowledge of any cases of diphtheria prior to the cases mentioned in the family of Mr. Otis Wilson, and know of no way that the disease could have been contracted, unless it was brought from Allegan county in the manner spoken of. If I remember rightly, Mr. Wilson said his friends who were visiting him at this time had just recovered from diphtheria before coming to Sheridan. I think it must have been brought in that manner. I did not see the case until in its last stages, it having been treated by another physician, who called it every thing else but diphtheria. I was simply called in to diagnose the case, as it was past help, and there was some dissatisfaction on part of family.

"There were but few more cases in Sheridan last winter, and those of a very mild type, as measures were immediately taken to prevent the spread of the disease. No more deaths resulted from it, to my knowledge. I know of no other source from which the other cases were contracted, and think it must have all sprung from that source.

"Yours Respectfully,

"DR. J. H. MOON."

All of which is respectfully submitted.

MILTON CHASE,

Health Officer of Otsego Township and Village.

11. There was also referred to the committee the following communication from F. Goodwin, M. D., of Cassopolis, Mich., reporting cases of diphtheria, with some evidence that the disease was conveyed by means of milk.

CASES OF DIPHTHERIA APPARENTLY COMMUNICATED BY MILK,—COMMUNICATION FROM

F. GOODWIN, M. D.,

OF CASSOPOLIS, MICH.,

CASSOPOLIS, MICH., May 19, 1879.

Secretary State Board of Health:

DEAR SIR:—I attended three cases of diphtheria last week, one a boy three years old, proving fatal. On Thursday the 15th I was called; he was over a chill with high fever setting in, and quite delirious, which went off in about four hours with sweating. On Friday a chill recurred three hours earlier than the day before, and all cleared up so the child was up and quite playful during the evening. In the night, at 3 A. M., I was called and found him quite feverish, with difficult breathing, and swelling on left side of his throat. On examination I found tonsils enlarged and a small deposit on each. At 9 A. M. I saw him again; breathing very laborious, tossing about and very restless, difficult swallowing anything, face bloated and congested, circulation languid, pulse high. At 11 severe chill set in which increased the symptoms; he became more choked up, and died at 2 P. M.

There had been no diphtheria in town for six weeks previous to April 1. Then Mrs. D., a lady about 28 years of age was taken, and had it very severe, so much so that her life was despaired of for ten days, and she has made a slow recovery, not being well yet. Now, the point I wish to call your attention to is, that this family sold milk to two families, in opposite directions, on the same block; and this milk was given to the boy to drink, that died, whom I spoke of in the beginning of this letter; and the other family that took milk had a child 18 months old which they were weaning, and it took the diphtheria, but lived through. One child in each family has had it since, and both recovered; and there has not been another case in that part of the town. Did the milk carry the disease? On the postal card report I send you this week, I reported only the cases I treated, being three; but I know of two others in town, treated by Dr. Kelley. I had one new case on Sunday, and one more this morning, the 19th, making nine cases since April 1.

Yours truly, F. GOODWIN.

12. A letter from Mrs. M. J. Williams, of Detroit, to Dr. Henry F. Lyster, a member of this Board, relating to cases of diphtheria which occurred in Utica, N. Y., several years ago, has been referred to the committee. In her opinion there was a relation between these cases and an unusual growth of fungi

on plums, in one instance, and, in the other instances, certain unsanitary conditions of premises.

CASES OF DIPHTHERIA IN UTICA, N. Y., ITS CAUSATION, ETC,—COMMUNICATION FROM

MRS. M. J. WILLIAMS,

OF DETROIT, MICH.

DETROIT, MICH., Feb. 17, 1879.

DR. LYSTER:—While recently looking over the "Report of the State Board of Health," I was especially interested in the articles on diphtheria, so many facts mentioned therein confirmed theories in regard to its *origin* which had long had an abiding place in my own mind, independent of any knowledge gained from others on this subject.

About seventeen years ago, in an eastern city (Utica, N. Y.), diphtheria in its severest form invaded my own family, and the household of friends and neighbors. Through many a weary day and sleepless night have I watched the fearful struggle for life in those who were victims to this dreaded disease, with a mother's keenest anxieties and perceptions aroused to the highest pitch. * * * * *

The first case of diphtheria which came under my notice was in the family of a neighbor. "The baby," a year and a half old, was stricken down. There had been no cases in the vicinity, the child had been delicate from teething, and had not been outside the front gate for weeks preceding its illness, so that it could scarcely have taken the disease by contagion from others. The day it died I shall never forget, so indelibly did every little circumstance impress itself upon my mind.

The mother being completely worn out with anxiety and grief, I took the little sufferer in my arms, and held it for several hours, administering remedies prescribed by the physician, and using every effort to restore vitality, which was fast ebbing away.

It was early in September, the weather oppressively warm, so that I sat near the open window, as the baby in paroxysms labored for breath. The room was a back parlor, opening into an old-fashioned garden, and in the intervals of quiet, my eyes would occasionally wander in that direction, and my thoughts stray here and there, back and forth, as they will involuntarily. There were many fruit trees in the garden, mostly plum-trees, and one very large one within a few feet of the window, loaded with fruit, as were all the others.

There was one peculiarity about plums that year which is rarely witnessed. It was this: Before ripening, while still clinging to the branches, they began to decay, and while one side of the fruit was fair to look upon (the sunny side), the other was actually loathsome. This premature decay was doubtless owing to the state of the atmosphere that summer, it being unusually wet and cloudy. All kinds of fruit were more or less diseased in many localities, if not through the entire State.

I had recently heard of diphtheria as a disease which was making fearful ravages in many parts of the country, and concerning which there seemed to be little known. A few days previously the newspapers gave an account of an entire family of nine persons near Albany who had died from its effects, and almost daily mention was made of similar fatalities in a less degree.

These facts occurred to mind as I watched the little sufferer in my arms, and thus did my thoughts wander. Why is it thus? These results do not come by chance, without a cause. Here is this dying child. From its birth it has been tenderly and intelligently cared for. Its home is in one of the healthiest localities in the city, with every sanitary condition apparently fulfilled. Whence hath come this distroyer, who walketh in darkness, leaving sorrow and desolation? As I thus questioned, my gaze again fell upon the fruit trees, and the answer came almost intuitively, *Death lurks in the drooping branches!*

Who could look at the mildewed globules, in the light of science, and not realize that there was danger in their exhalations? Invisible germs perchance, floating free and wide in the surrounding atmosphere, liable at any moment to invade the unguarded sanctuaries of human life.

To the strong and healthy, who for a few hours a day only were exposed to this pernicious influence, no perceptible harm might result. But alas for those who like the feeble child, have no stamina of their own to resist the evil.

The following January another fatal case occurred in the same neighborhood. Extremely sad also were the circumstances.

The youngest son of a clergyman, a noble lad of rare promise, had been out skating with his friends. On his return home at night he complained of sore throat, headache, etc. The mother, somewhat of an invalid herself, had recently been

treated hydropathically with benefit, and had frequently used the same methods in her own family for slight ailments. Thinking the boy was only suffering from a common cold, she applied her usual remedies, and he grew rapidly worse. A physician was called, but too late, death had already set his seal.

Being winter time, of course, in this case, there were no diseased plums on which to cast the blame. But in the cellar, which was literally a large store-room, back of the basement hall, and opening into it, was a liberal supply of potatoes and apples, many of them tainted with decay. In this basement hall was a large portable furnace which diffused its heat by means of registers and open stairways throughout the house, affording also a convenient medium for dispensing such poisonous exhalations, as would naturally arise from the store-room and mingle with the currents of heated air.

The next June my two little girls were taken with the disease, in mild form at first, and after a short illness were pronounced convalescent. But the youngest, from over exertion or undue nervous excitement, had a most dangerous relapse, and for many days we feared each one would be her last. Life, however, conquered.

At first it was a mystery how the children had contracted the disease. We knew of no cases near, and everything connected with the premises appeared to be all right. But soon after, while exploring the cellar, the problem was solved. The residue of the winter's supply of potatoes had recently been assorted, and nearly half a barrel of decayed ones carelessly left behind the outside basement door, by the person whose business it was to attend to such matters. This door, which was left open in summer, led upwards by a few steps into what was once a conservatory, enclosed with glass, and a favorite play-room of the children. There, evidently, the illness was contracted.

From the above cases, and many others, was this conclusion, then, derived, namely, That diphtheria is a poisonous influence, or *growth*, in the blood, emanating from decomposing vegetable matter, and introduced into the human system, either by inhalation, or swallowed with improper food.

Whether it belongs, however, to such parasitic species as mildew, ergot, and other deadly fungi, or is evolved in the fluids of the body by *fermentation*, in a manner analogous to the vinegar plant, expert scientists alone could determine, by microscopes or chemical analysis.

* * * * * * * * * * *

Florence Nightingale, in her Treatise on Nursing, advanced the somewhat startling assertion that, in certain diseases, more sick people died of starvation, by the neglect of nurses to supply proper nourishment, than from the disease itself. The same idea was also elaborated by an English physician, in a book entitled the "Breath of Life." Both works are doubtless familiar to you.

May not diphtheria belong to this class of diseases? And if so, how many precious lives might be saved by *frequent* and *persistent* efforts on the part of mothers and nurses, to administer life-giving nutriment in the critical stages. These suggestions have often occurred to mind, without any occasion for giving them utterance. But when scanning the "Report," my eyes fell upon the paragraph, "*facts* are wanted, not *opinions*," my pen was impelled to bestow a few of each. Trusting they will not prove to be an intrusion upon your patience, but received in the same spirit which has prompted them, I am

Yours respectfully,
MRS. M. J. WILLIAMS.

No. 12, Columbia St. East.

13. Dr. W. W. Switzer, of Tekonsha, Mich., sends the following on the causation of diphtheria, all of which is commended to the medical profession and others, to be established or disproved by careful observation and recording of facts:—

"The following may be of interest and worthy of note. Dr. Melville C. Keith, of Augusta, Me., claims through the 'U. S. Medical Investigator,' that in a practice of twenty-nine years, including a knowledge of 1,100 cases of diphtheria recorded, children not fond of Irish potatoes are not subject to attacks of this dreaded disease, and that those who refrain from eating them are entirely exempt. So sanguine is he that this is true that he says he has offered to treat any case of diphtheria in his city, free of compensation, if the patient has not used potatoes in his diet. The editor of the Chicago Inter-Ocean claims perpetual exemption by scrupulously avoiding sun-burned or *solanum* poisoned tubers. The editor of the Investigator thinks the disease may be due to excess of starch over-taxing the salivary glands and increasing

the size of the liver. Dr. Wilson, of West Meridian, Ct., traced attacks to kerosene burning, which may be a caution against the perpetual night lamp in many sleeping-rooms.

"Yours truly,
"WALLACE W. SWITZER, M. D."

14. Having learned that Dr. W. T. Stilwell, of Kalamazoo, had just treated several cases of diphtheria, supposed to be caused by milk, I requested of him a statement of the facts, which he kindly gave, as follows:—

DIPHTHERIA AND ITS CAUSES,—COMMUNICATION FROM

DR. W. T. STILWELL,

OF KALAMAZOO, MICH.

On the 28th day of July, 1879, I was summoned to visit the family of Mr. W., living a short distance in the country. His wife and little girl, aged 4 years, complained of what seemed to be a malarial type of fever, with some tenderness of the throat.

The day following, the little girl's throat presented a very severe form of diphtheria, rapidly filling the throat with characteristic membrane and great swelling, both internal and external; also, severe pain in the bowels, with frequent desire to go to stool, without relief. The mother's throat also presented the same character of membrane upon one side, with great pain, swelling, and tenderness in the entire fauces. The mother's case yielded to treatment after a lapse of several days. That of the little girl proved fatal on the 6th day of August, ten days after the first visit.

There appeared on the body of the little girl about the fourth day a very peculiar eruption, spreading rapidly over the entire body and extremities, and not that of scarlatina rash in appearance, but resembling more that of herpes, very painful and quite confluent over a large portion of the body. Large portions of the membrane in the throat were detached from day to day, leaving a roughened, livid surface with no reappearance of membrane; but the exhaustion of so great a blood poisoned system could not survive its shock.

On the eleventh day following, two more of the older children, boys, were attacked with the same. The membrane in the throat of these two cases was not as extensive as in that of the little girl, nor was there any eruption, but the poisoned system and great prostration was very severe and protracted, with final recovery. On the twenty-fifth day following another little girl several years older than the former was taken down with the same in a very severe form, with extensive development of the membrane, great shock and prostration to the system, with final recovery after a severe struggle in the case.

A few rods distant resided another family, that of Mr. F., and in that family a daughter, an adult and a relative of the other children, was sick with the same disease, and at the same time, with a slight formation of membrane, but very severe and protracted prostration with slow recovery. As these cases had so suddenly appeared in a very healthy locality, and there were no other cases about at the time, nor previously, it seemed as though there must be some local cause for its development.

On examination of the surroundings, cess-pools, water-closets, sewerage, and drainage, the evidences were decidedly negative, and the drinking water was supplied for both families from a newly and well filtered cistern, as they informed me; but to make more sure of its purity I gave it a thorough test after the manner described in the Boston Journal of Chemistry, with a vial of the water slightly sweetened with pure loaf sugar, tightly corked and submitted to the rays of sunlight for several days, which in this case developed but very little of flocculence or turbidness, proof of its containing but little organic matter, quite as pure as most of our common well and spring water,—a test which may be deemed quite reliable as having no better mode at our limited command. My attention was then turned to the milk supply of these families.

From a recent report of the local government board of the northern part of London, England, where some 264 cases of diphtheria occurred in one locality, many proving fatal, and this district all received its milk supply from a particular source, Mr. W. H. Power, the medical officer of the board, said their investigation led to no discovery of sewer gas as the cause, as was first suspected, but to *milk*, and all supplied by a particular dealer.

In the present cases, these families used milk,—many of the children very freely,—from the same cows, and the little girl whose case was fatal, as the mother expressed it, "principally lived upon this milk." The cows seemed to be quite healthy, and

the milk of good quality; but the cows drank daily while driven to pasture from a stagnant pool of water sunken in the ground, with a hard clay bottom, where the hogs wallowed, with sloping banks, receiving the wash of all litter around its edges.

Was this the source and cause of this frightful and fatal disease?

Is it possible that a certain diseased condition of the cow might develop diphtheria in the human subject, in same way that cow-pox induces vaccinia?—a bovine virus, from the milk source heretofore unsuspected?

W. T. STILWELL, M. D.

Kalamazoo, Sept. 26, 1879.

15. The following communication from Dr. Orville Marshall, of Lansing, traces an outbreak of diphtheria in DeWitt township, Clinton county, and mentions several cases occurring in the city of Lansing. This report of these cases presents strong evidence of the contagiousness of diphtheria.

OUTBREAK OF DIPHTHERIA IN DE WITT TOWNSHIP, CLINTON COUNTY,—MODE OF COMMUNICATING THE DISEASE, ETC.,—COMMUNICATION FROM

O. MARSHALL, M. D.,

OF LANSING.

Dr. H. B. Baker, Secretary State Board of Health:

DEAR SIR:—Enclosed I send you a map of a part of the township of DeWitt, Clinton county, Mich., showing the location of an epidemic of diphtheria which occurred in the fall of 1878. The first case occurred in the latter part of the month of August of last year, in the family of Mr. George Keck, Mrs. Keck being the first one in the family taken sick. She contracted the disease by visiting a family who had diphtheria in the township of Olive, in the neighborhood where Dr. Topping reported the disease prevailing last year.* Mrs. Keck's visit to this family was on Sunday, and she was taken sick on the Thursday following. The distance from Mr. Keck's to the house visited in Olive is six miles. The whole of Mr. Keck's family, of eight persons, had diphtheria.

A son of Philip Kraus visited the Keck family while they were sick, and four days after he came down with the disease. From this case diphtheria went through the family of Mr. Kraus, including the hired help and a neighbor by the name of Daniel Bowers, who came in to assist them, making ten persons sick with diphtheria in one house.

After he was taken sick, Mr. Bowers staid at Mr. Kraus' house, but before he was fully recovered returned home; the result was that four of his children had diphtheria, two of whom died.

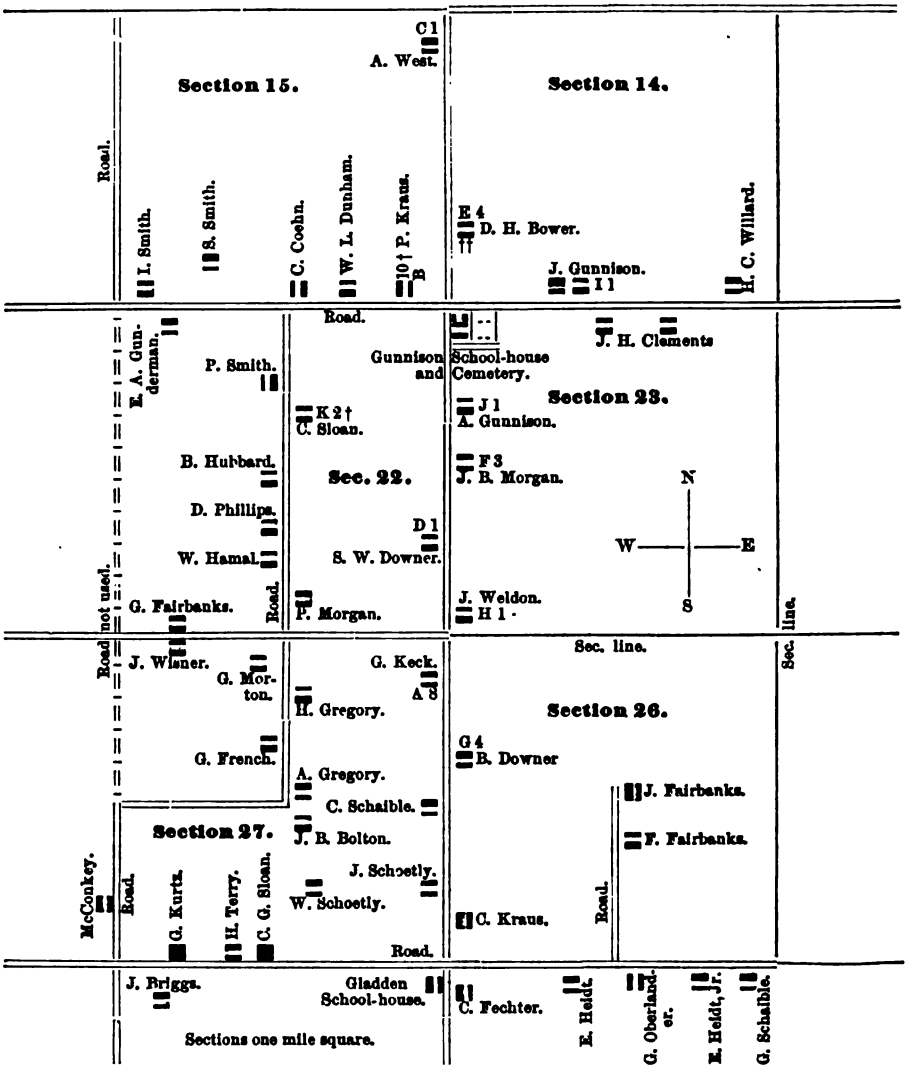
The disease showed great malignancy in the family of Philip Kraus, although there was but one death, a son eleven years old. The location of his residence is on the side of a hill about thirty rods northwest of the Gunnison school-house and cemetry, as shown upon the map. There is nothing in its location which might be said to be bad in a sanitary point of view, unless the cemetery can be considered such. An examination of the cellar showed it to be light, clean, and well ventilated, and the same might be said of the whole house, with one exception. Under a shed joining the house in the rear, I found an abandoned well, the odor from which was not pleasant. The reason why it was abandoned was the impossibility of keeping out rats, frogs, and other animals. About twenty feet from the old well was the new one; the depth to water was about the same in each. The old well was not filled up when abandoned, but left as when last used, rats, frogs and all, the well being simply covered over with boards. About six feet from the new well was a hen-coop, with a roof made in such a way that when it rained the water washed the droppings from the coop into an excavation made by horses brought to the well to drink. It would be easy to imagine that the impurities from the hen-coop might find their way into the well. I do not think that the old well or the hen-coop near the new one produced diphtheria in this family, but I do think that they made the disease more malignant when the patients were attacked.

With the history of the disease in the Bowers family, who lived across the road from Philip Kraus, I am not familiar, as they were not my patients. An interesting case connected with the sickness in this family occurred three weeks ago. I was called Sept. 14th to see a young lady sick with diphtheria, who informed me that she was the present school teacher at the Gunnison school-house; that four days before being attacked she had slept one night at the house of Daniel Bowers, near the school. The probabilities are that she slept in a bed occupied by a diphtheria patient

OUTBREAK OF DIPHTHERIA.

MAP OF A PART OF DEWITT TOWNSHIP, CLINTON COUNTY, MICHIGAN.

Letters A, B, C indicate order of occurrence of the disease. Figures indicate the number of cases at each house. The number of daggers, thus †, indicates the number of deaths.



At most of the houses on section 22 there were no young children.

Running west through the south part of section 14 and diagonally northwest through section 15 is a large creek which unites, in the northwest part of section 15, with a creek that crosses the northwest corner of section 22 and passes north through section 15 to the first-mentioned creek. The spread of the disease seemed to have no connection with the water-courses.

Sections 23 and 26 border on, and are partly included in, the "Big Marsh." West of sections 22 and 27, and partly within them, is a large tamarack swamp.

Sections 14, 15, 22, the northwest part of section 23, and the north part of section 27 are high sandy knolls and ridges; the remainder of sections shown on the map is mostly clay soil,

last year, as the house is small and scantily furnished, there having been four persons sick at one time with diphtheria in this house last year, two of whom died.

At the time of the death of Mr. Kraus' son, Mr. Charles Sloan, a neighbor, attended to the preparation and dressing of the body for burial. A few days after this occurrence two grand-children of Mr. Sloan's, living in Lansing, five miles away from his house, were taken sick with diphtheria. There had been visiting between the families, the particulars of which I could not learn. About the middle of the month of January last, two more grand-children of Mr. Sloan's from another family who lived near St. Johns, visited him; they also visited the grand-children in the city; the result was they were attacked with diphtheria a few days after, at Mr. Sloan's house, and one of them died.

Of the remaining cases shown upon the map, the evidence of contagion was pretty clear. Mrs. S. W. Downer visited the Keck family when they were sick, and the only child at her house soon had diphtheria. Children of J. B. Morgan, Jas. Weldon, and B. Downer visited the patient at S. W. Downer's, and they all had diphtheria. Others claimed to have been exposed to the disease in school. The schools in the Gunnison and Gladden districts were closed as soon as the nature of the disease became known to the school officers. I believe no cases of diphtheria occurred among children attending school in the Gladden district. One of the Keck children was attending school at the Gunnison school-house when other members of the family were sick with the disease.

From the cases shown on the map the disease seemed to extend northeast into the township of Bath, where there has been a large number of cases and many deaths.

Many cases have occurred in Lansing, which seemed to be connected with those in De Witt; but up to the present (Oct. 7, 1879) diphtheria has not prevailed in the city as an epidemic. I think the reason of this was in part owing to a resolution early adopted by the city board of education, instructing teachers to dismiss from school all scholars who had sore throat, and also to exclude from school until they were fully reecoverd, all scholars in whose homes there were persons sick with diphtheria.

The first cases of diphtheria which I saw in the city occurred about the same time the Keck family were taken sick in the country. These first cases seemed to have some connection with the cases in the townships of Riley and Olive, reported by Dr. Topping last year.* A neighbor of one of the families in the city where they had diphtheria had attended a funeral of a diphtheria case in the township of Riley. The evidence of contagion in these cases in the city was not very decided in a majority of instances. Latterly this seems to be changed.

Several other cases showing the contagious nature of the disease have occurred which may be of interest. December 12th of last year a son of James Truesdell, in this city, was taken sick with diphtheria. I was informed by the grandmother of this boy that he had been brought home sick from her house in the village of De Witt; that a few days before he had been in a neighbor's house where they had had severe cases of diphtheria six weeks previously.

An instance of the cause of diphtheria being retained in bedding, occurred in the family of W. H. Kynett, of this city. In the month of February of this year a friend of the Kynetts, in a neighboring town, lost her only child with diphtheria. Shortly after this she broke up housekeeping and brought her bedding to Mr. Kynett's house and stored it in an unused room. About the first of May following, this bedding was unpacked, a young daughter of Mr. Kynett's being present; a few days after this she was taken sick with diphtheria and died.

Diphtheria appeared in the family of Joseph Sneeberger, who lives about two miles north of Lansing, February 19th. At this time four members of the family had the disease. Three months after these cases two more who had not previously had the disease, were taken sick with it; these were all severe cases. Mrs. Sneeberger is a sister of Philip Kraus whose family suffered so severely last fall. I have been informed that another sister's family living in the town of Bath have also had the disease since.

Many other cases showing the contagious nature of diphtheria might be given. As the disease still prevails in this vicinity, I may be able to furnish other facts relating to it, if desired, at another time.

Respectfully yours,

O. MARSHALL.

Lansing, October 7, 1879.

* Page 85, Report Michigan State Board of Health, for 1878.

A brief analysis of the foregoing papers will, I think, be found to be a considerable contribution to the STUDY OF DIPHTHERIA, or, at least, confirmatory of a number of propositions in regard to the disease, now very generally accepted by the medical profession. So far as they go, also, they appear to fully justify the document issued by this Board on the "Restriction and Prevention of Diphtheria."

In this study the following propositions appear especially to receive confirmation:—

1. Diphtheria not infrequently appears to break out *de novo*.

In the Sanitary Record of Sept. 6, 1878, W. N. Thursfield, M. D., S. Sc. C. Camb., thus puts the proposition: "That its endemic breeding-grounds are to be found in certain well-defined spots in rural districts, where it is constantly liable to break out as if *de novo*, and that the constant condition of these localities is *structural dampness of habitation.*" In another place he says: "I can point to isolated houses which have been attacked by diphtheria at intervals of years, [as in Dr. Sabin's report printed above, page 115], where the dampness has chiefly resulted from the house being shut in and closely surrounded by trees, with, in some cases, the earth at the back almost level with the eaves. *Whatever conditions seem to favor fungoid growth would seem to favor the incidence and persistence of the disease.*" Dr. Arthur Downs, S. Sc. Cert. Camb., suggests that "the *contagium vivum* of diphtheria is capable of prolonged existence under conditions independent of the human organism,—possibly as a low growth on damp surfaces."* Is not this the true way of accounting for the apparent origin of the disease from decaying vegetables in the cellar, from filthy cesspools, as in the first series of cases reported by Dr. Palmer (page 107). from sewer gas, or, as in the letter of Mrs. M. J. Williams, (page 122), from decaying plums upon the trees? Conditions existed in each case favoring fungoid growths. *Are the conditions that favor such growths the essential cause of the disease*, or *are some forms of the fungoid growths themselves the cause?*

2. These papers tend to confirm the conviction that diphtheria is *contagious* or *infectious*.

The disease appears to be more contagious at some times than at others, in the same place; and more contagious in some places than in others, at the same time. In some epidemics of the disease its contagious nature appears to be so virulent as to be described as infectious. Would not this fact go to show that the *conditions* that favor fungoid growths are rather the essential cause of the disease than the fungoid growths themselves? For the *conditions* might not be so strong or intense at one time as at another, or in one place as in another, and so would not affect persons to such a degree as to cause the disease; but if the fungoids were the essential cause of the disease, and they were actually produced, we should expect they would follow the law and reproduce themselves.

3. A predisposing condition of the individual is certainly favorable if not necessary to the development of the disease. These predisposing conditions are oftenest found in young persons, from one year old to sixteen. Is it not true that the "*conditions that favor fungoid growths*" more readily affect the young than the old and make them subjects of the disease? Colds or slight sore throats in persons living in places favorable to the development of the disease render them especially liable to an attack.

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* American Medical Bi-Weekly, Jan. 18, 1879.

4. The disease is communicable from the mildest cases. Such cases are especially liable to give origin to an epidemic which may be severe or even malignant. This is the reason why, of all diseases, diphtheria is most liable to be spread by schools, children being frequently affected with the disease so lightly as not only not to be disabled from attending school, but not even to give any external sign that they are the subject of the disease. Hence, when diphtheria is known to exist in a neighborhood, children affected by even a slight sore throat should be scrupulously isolated, or the school should be closed. It is sometimes said that some physicians appear unwarrantably to increase the number of their cases of diphtheria, and especially their per cent of cures, by calling all cases of slight sore throat, and especially all cases with slight patches of a whitish color on the tonsils, or any part of the fauces, cases of true diphtheria, especially if in the vicinity there has been an undoubted case or two of the disease. Such a practice as that is doubtless deleterious to professional accuracy in the diagnosis of the disease, and is a large element of error in its statistics; but, accompanied with proper sanitary restrictions in all cases of *so-called* diphtheria, would it not be more likely to restrict its spread than a more exact and exclusive diagnosis, which, in its exactness, might overlook or misname some real, though slight cases of the disease?

Almost every epidemic of diphtheria is either preceded, accompanied, or followed by numerous cases of sore throat, called sometimes "quinsy," or "tonsilitis," or simply "sore throat." This form of disease Dr. Arthur Downs considers "essentially identical with undoubted diphtheria," for these reasons,* viz., "1. These sore throats prevail correlatively with the unquestioned cases of diphtheria. 2. Under favorable conditions they may communicate the typical form of the disease. 3. The latter, also, in its turn, gives rise to these apparently trivial sore-throats." He adds: "I can only repeat my conviction that, if the public generally, and medical men in particular, dropping the misleading name derived from a variable pathological appearance, would regard these concomitant 'sore throats' as essentially 'diphtheritic,' a great point would be gained toward the *isolation so necessary*, but at present so *difficult to obtain*. It is to this end that Dr. Thursfield, whose experience is second to none, strenuously urges the disuse of the modern term 'diphtheria,' and the resumption of the old name 'contagious cynanche.' "

5. The infection of diphtheria is especially portable.

Thus we see it apparently conveyed for quite long distances by persons going from an affected house, but who themselves have not had the disease. In other cases persons just going to an affected house, though tarrying only for a few minutes, seem to convey and communicate the disease to others, though they themselves escape. Persons long considered convalescent also, appear in some cases to retain about them the germs, or the "*contagium vivum*," of the disease, so as really to communicate it to others. These considerations, apparently established, demonstrate the importance of strict and long-continued isolation, and an effective disinfection of person and clothing.

6. There are certain cases in which the disease appears to be conveyed and distributed by milk. In the cases reported by Dr. Goodwin of Cassopolis, (page 121), was the milk the means of communication? or was it the persons who conveyed the milk?

It is well known that milk when standing is especially apt to become "tainted" by the absorption of volatile particles floating in the air. It does

* American Medical, Bi-Weekly, Jan. 18, 1879.

not therefore seem unreasonable to suppose that the essential "germs" or the "*contagium vivum*" of diphtheria would be absorbed and conveyed by it. Certain it is that the distribution of milk from a house where the disease prevails is dangerous to those families who receive it.

May it not be, also, as is hinted in Dr. Stilwell's cases, (pages 124–5), that through the milk is the *de novo* origin of the disease in some cases? If, as has been suggested, just those conditions that favor fungoid growths favor the development of the *essential cause* of diphtheria, were there not present around that mud-hole in August, where the hogs wallowed and from which the cows drank twice a day, conditions that might confidently be expected to develop the *essential cause* of the disease? If that "essential cause" is the germs or spores of some low fungoid growths, what should hinder their being taken in by the cows with the water they drank and affecting the milk so that it would cause the disease?

7. Public funerals of persons dying of contagious diseases are dangerous to the public health and ought to be forbidden by law. I suppose it is safe to say that aside from schools there is not a more fertile way of spreading diphtheria than by public funerals, where the dead body is presented to the gaze of the curious. Many persons, young and old, on such an occasion, crowd every part of a house which has, perhaps, for days been infected with the disease, and when the disease becomes fearfully and fatally epidemic the whole community wonder and are aghast at the "mysterious dispensation of Divine Providence;" whereas, had the family with a few adult friends quietly and speedily buried their dead and thoroughly disinfected their house, Divine Providence would have smiled upon that community by giving general health. God may often very truthfully be said to be a "wall of fire round about" the people when fire is used for thorough disinfection from disease.

It is greatly to be regretted that every local health officer does not put into every household the two pamplets issued by this Board on the Restriction and Prevention of Scarlet Fever and of Diphtheria. The paying out of a few cents for that purpose would frequently, it is believed, save in many a community very many precious lives and much money now spent for disease and death.

8. The interesting papers by Dr. Marvin of Ithaca (pages 111–115), raise the question whether the spread of diphtheria in general is in the direction that the prevailing winds blow. The facts which he cites and the map given of the progress of the epidemic of which he writes, certainly appear to justify such a conclusion. If that manner of the spread of that epidemic was true in this case, the "*contagium*," if "*vivum*" must have been of such a fungoid growth as would bear the frosts of winter and the heat of summer; for the history of that epidemic extended over both. Dr. Marshall also states (page 127), that the disease extended north-east from the cases which he reports, into the township of Bath. But it may be that, in both cases, the facts can be explained by other means of communication than the winds. It will be noticed that east and west of the cases reported by Dr. Marshall are large uninhabitable swamps, and that northwest from these cases there were but few young children, so that the disease could not well extend in these directions. The question proposed by Dr. Marvin is, however, well worth studying. If the contagium of this disease is really the spores of some fungus, nothing is easier to believe than that these spores, as the spores of known fungi and the seeds of many plants, are really spread by the prevailing winds. And, indeed, if in all epidemics of the disease observed it should be found to spread mainly in the direction in which

the prevailing winds blow, will not that fact be something of an argument in the support of the theory of a "*contagium vivum?*"

Certainly it is very desirable that in all parts of the State careful observations be taken and recorded as to this question: Does the disease most frequently spread in the direction in which the prevailing winds blow?

II.—ERYSIPELAS AND PUERPERAL FEVER.

Several cases of erysipelas have been reported from various parts of the State nearly synchronous with cases of puerperal fever occurring in the same places.

Inquiries were instituted by Dr. Baker to ascertain if there were any facts in the histories of those cases which would tend to establish the identity of the two diseases or to show that a contagium might be carried from erysipelas patients, which in lying-in women would cause puerperal fever.

These inquiries have elicited the following replies, which, although they are mostly negative, as to establishing the identity of the two diseases, nevertheless in some instances point to the danger of conveying a contagium from an erysipelas patient to a parturient woman, which would in her cause puerperal fever. In the first paper one case is stated, where, in the opinion of the physician himself, he did carry the contagium that produced puerperal fever from an erysipelas patient; and in the third paper the danger of conveying the contagium from one case of puerperal fever to other lying-in women by the accoucheur is very properly and markedly referred to.

The profession is now in possession of numerous facts which, although not perhaps clearly demonstrating the identity of the two diseases, yet at least point strongly to the danger of, and loudly warn against, the practice of any physician while he is in attendance upon an erysipelas or puerperal fever case attending any case of confinement or any woman during the puerperal period.

These communications were received in response to inquiries, sent by Dr. Baker, nearly identical with the following:—

———————,

DEAR SIR:—In your report of diseases for the week ending Saturday, ——— ———, you mention both erysipelas and puerperal fever. So much has been written concerning the relation of these two diseases that we desire to obtain and place on record facts bearing on the subject, whenever an opportunity occurs. Will you have the kindness to write me concerning these cases? After you have investigated the subject, I should be glad to have a report of the facts tending to *prove* or *disprove* any connection or relation between the two diseases.

1.—REPLIES FROM R. B. SMITH, M. D., OF WEBBERVILLE, MICH.

WEBBERVILLE, MICH., April, 1879.

Henry B. Baker, M. D.:

DEAR DOCTOR:—In reply to yours of March 31, 1879, will give you a history of the cases you mention. March 8 I was called to see a patient 5 months old, suffering with facial erysipelas of a severe type. The disease showed itself first on the left side of the nose, and extended from there in all directions till the whole of the face and nearly all of the scalp became involved. There was considerable swelling, extreme tenderness and redness of the whole of this surface. Pulse ranged from 130 to 170 per minute; temperature from 103° to 105¼°. Patient gradually grew worse till March 24, when death relieved it. March 15 I was called to attend Mrs. B. in her third confinement. Found her in labor, os well dilated, and labor-pains regular. Labor normal. Delivered of large, healthy child. March 16, patient doing well in all respects. March 17, about 48 hours after delivery, I found patient with severe headache, pulse 100, temperature 103½°, considerable tenderness in the region of uterus, and obstinate constipation. March 18, 19, and 20, condition about the same, with increased tenderness, some tympanitis, tongue coated and dry. March 21, 22, and 23, symptoms remained about the same, except there was in addition wakefulness

with constant delirium. March 24, patient commenced to improve in all her symptoms, and is making a good recovery. For several reasons I am inclined to the opinion that the case of erysipelas bears a direct relation to the case of puerperal fever: 1. Both cases occurred in my practice. 2. I had been attending the case with erysipelas seven days previously to attending Mrs. B. in confinement. 3. Had been to visit the patient with erysipelas about six hours before being called to attend Mrs. B. in labor. 4. This was the only case of puerperal fever it has ever been my misfortune to have, although I attended two other cases of confinement during the time of the case with erysipelas, both making a good recovery.

In regard to the patient with puerperal fever, I will say that she had been in very delicate health for about four months previous to childbirth, which perhaps made her more susceptible to the poison.

Respectfully, R. B. SMITH, M. D.

2.—LETTER FROM E. A. HERIG, M. D., HEALTH OFFICER OF SAGINAW CITY, TRANSMITTING REPLIES FROM DR. L. W. BLISS.

SAGINAW, MICH., May 27, 1879.

Henry B. Baker, M. D.:

DEAR SIR:—In complying with your request of the 30th ult., I endeavored to get the wanted information at once, which, on my request, was handed to me written. I herewith forward to you this original answer by Dr. L. W. Bliss, which I deem sufficient to respond to your inquiry.

Very respectfully, DR. E. A. HERIG.

REPLIES BY DR. L. W. BLISS, OF SAGINAW CITY.

SAGINAW, May 2, 1879.

Dr. E. A. Herig, Health Officer:

DEAR SIR:—The case of puerperal fever commenced, or I was first called to it, Sunday, the 20th ult., which was in the 1st ward. It was her third confinement. The case of erysipelas was in the 3d ward, nearly three-fourths of a mile apart, and the friends of both are not on visiting acquaintance. And further, the case of erysipelas I was first called to see on the 21st ult., P. M. She is about 52 years old, and had suffered from facial neuralgia for some time, but had had no physician in attendance. Nor can I trace any connection between the two cases. Nor have I ever found any connection between the two diseases heretofore. I also shall report this week another case of phlegmonous erysipelas in the 6th ward to which I was called last night. If there is any connection the puerperal fever would propagate the erysipelas, as the case of fever occurred prior.

Yours truly, L. W. BLISS.

3.—REPLIES BY W. H. ROUSE, M. D., OF DETROIT, MICH.

441 SIXTH STREET, DETROIT, *May 12, 1879.*

Secretary State Board of Health:

DEAR DOCTOR:—Your favor of the 6th, inquiring in regard to the cases of erysipelas and puerperal fever which have occurred in this vicinity, with especial reference to any connection that may have been observed between these diseases, is received. Since my last communication to you on this subject there have been quite a number of cases of erysipelas, especially during the last four or five months, and of late a few cases of puerperal fever. I have attended a number of cases of erysipelas, but have seen none of puerperal fever.

I have regularly attended puerperal patients while in attendance on cases of erysipelas, and have never found trouble result. Many others are doing the same. This should not be the case if puerperal fever could be readily induced by infection carried by the attendant, as has been supposed. No cases of these diseases have been observed in which the histories show the slightest connection, except in similarity of symptoms, so far as I have been able to see or learn. It would be useless to give the histories of these cases, as they leave the subject as before, viz., no observable connection between the two diseases.

There is one rather remarkable circumstance connected with cases of puerperal fever, which seems to hold good in successive epidemics, or cases, and that is one or more, but a comparatively limited proportion, of those who attend puerperal women, have all the cases of puerperal fever, the other accoucheurs being free from this difficulty. It is not unusual for one physician to have many cases of this fever while other physicians, some of whom assist their unfortunate brother, have no trouble with their puerperal patients. Even fear, so potent a factor at times in developing disease, is

not sufficient in these cases; for I have seen many a woman in tears as I entered their rooms to attend them—weeping for fear of death from this much-dreaded disease.

This looks as if there was something about the particular individual which renders him or her susceptible of carrying an infection from one patient to another. Whether this be some inherent peculiarity of the individual, not usually possessed by ordinary mortals, or from want of cleanliness or care, I am unable to determine.

A few years ago a rather severe epidemic of puerperal fever, so far as one physician was concerned, occurred in a town of about 4,000 inhabitants. The trouble was confined to the patients of one physician, who had the leading practice in the town and surrounding country; no cases, so far as I can learn, occurred in the hands of the other practitioners. The land was undulating, the locality usually very healthy, and at the time few or no cases of erysipelas were reported.

I therefore fail to find any facts to sustain the idea that these diseases are either identical or transmutable.

Yours truly, W. H. ROUSE, M. D.

4.—REPLIES BY CHARLES W. NILES, M. D., OF CALUMET, MICH.

CALUMET, L. S., MICH., *July 28, 1878.*

Secretary State Board of Health:

DEAR SIR:—Dr. E. H. Pomeroy, one of our mine physicians, in whose practice the case of puerperal fever occurred, says there could have been no connection between the cases of erysipelas and puerperal fever reported for July 6, 1878.

The lady who had puerperal fever was confined June 26th, and was the fourth and last confinement attended by the doctor on that day. The doctor visited no patients until after having attended this case.

Puerperal fever is a very rare disease with us; erysipelas is very common, both the traumatic and the idiopathic varieties. We cannot recall any case of puerperal fever as being directly caused by erysipelas infection.

I believe, however, that puerperal fever may be produced by the infectious and contagious nature of puerperal fever, erysipelas, scarlatina, small-pox, hospital gangrene, diphtheria, the post mortem, and other poisons.

Yours respectfully, CHAS. W. NILES.

5.—REPLIES BY O. MARSHALL, M. D., OF NORTH LANSING, MICH.

Secretary State Board of Health:

DEAR SIR:—The particulars of the childbed fever and erysipelas cases are as follows:

Mr. E. P. of this city was taken sick with facial erysipelas Nov. 10, 1878; he was sick about ten days. His wife, at that time, was past eight months in pregnancy. They both slept in the same bed, except during Mr. P.'s illness. Mrs. P. was confined Dec. 6; she was placed in another room on a new bed, no bed-clothes were used on her bed which had been on Mr. P.'s bed. Dec. 10 Mrs. P. had a severe chill, followed by high temperature and rapid pulse, with great abdominal pain and tenderness. Although these symptoms were very alarming she made a good recovery after a week's illness. Mr. P. had a return of facial erysipelas the same day that Mrs. P. was attacked with fever.

In my practice during the year 1878 two cases of childbed fever occurred before Mrs. P. and one case after. The relation which these cases had to each other and to other cases of obstetrics occurring in my practice is best shown on the following table. Of the four cases of childbed fever given, one died. During the time given I attended many cases of diphtheria, some of them quite malignant.

Obstetrical Cases, Oct. 3 to Dec. 30, 1878.

No. 1878.

1. Oct. 3.—Miscarriage, no unusual symptoms followed.
2. Oct. 9.—Patient attacked with childbed fever Oct. 12; recovered.
3. Oct. 12.—Miscarriage, patient had peritonitis; recovered.
4. Oct. 27.—No unusual symptoms followed.
5. Oct. 28.—No unusual symptoms followed.
6. Oct. 30.—No unusual symptoms followed.
7. Nov. 14.—No unusual symptoms followed.
8. Nov. 17.—No unusual symptoms followed.
9. Nov. 19.—No unusual symptoms followed.
10. Nov. 20.—Patient attacked with childbed fever Nov. 22; died Dec. 1.
11. Nov. 28.—No unusual symptoms followed.

12. Dec. 3.—Miscarriage, no unusual symptoms followed.
13. Dec. 6.—Patient attacked with childbed fever Dec. 10; recovered.
14. Dec. 18.—No unusual symptoms followed.
15. Dec. 24.—Abortion, six months; no unusual symptoms followed.
16. Dec. 25.—No unusual symptoms followed.
17. Dec. 25.—Patient attacked with childbed fever Dec. 27; recovered.
18. Dec. 30.—No unusual symptoms followed.
19. Dec. 30.—Miscarriage, no unusual symptoms followed.

O. MARSHALL.

Lansing, Oct. 13, 1879.

III.—TYPHOID FEVER.

The following cases of fever with typhoid symptoms, reported by Dr. Clapp, of Mendon, are submitted together with the analysis of the water from the suspected well, and a diagram of the surroundings of the well.

CASES OF FEVER SIMULATING TYPHOID FEVER, ATTRIBUTED TO USE OF IMPURE WELL-WATER,—COMMUNICATION FROM

H. C. CLAPP, M. D.,

OF MENDON, MICH.

MENDON, MICH., May 19, 1879.

Secretary State Board of Health:

DEAR DOCTOR:—Agreeably to your request, I send you a statement of a fever simulating typhoid, which broke out in the family of James Monfort, living in Nottawa township, four miles south of Mendon, and of the probable cause. During the last four years they have had more or less of sickness, some of a severe type. In February, 1875, his little girl, aged five years, had scarlet fever of a mild form. In February, and again in August, 1876, the same girl had what was called a bilious fever. From the 11th to the 22d of May, 1876, Mrs. Monfort was *very* sick with facial erysipelas, and in July, 1877, with a severe attack of neuralgia of the head and face.

Chas. Monfort, the subject of this fever, had a remittent fever in December, 1877, and was *peculiarly* sick in August, 1878, the symptoms being those of depression, something like sunstroke, but which it could not have been, owing to the coolness of the weather then existing.

His general health from that time did not seem to be good up to the 22d of March, 1879, when he was attacked with the symptoms of a typhoid fever of a most severe form, the nosebleed being at times alarming, the blood thick and dark, almost *inky*, the sordes completely covering the teeth and lips and very black, tongue dry and brown, and a general manifestation of depression from the beginning. There was but a slight tendency to diarrhea, some tenderness in right hypochondrium, no tympanitis, and no *observable* rose-colored patches. But what was a little remarkable was the *free* and sometimes *excessive* secretion of urine, of a nearly normal color. I did not test it for albumen or anything else. Another peculiarity was its tendency to relapse about every *fifth* or *sixth* day. There would be a gradual abatement of the symptoms up to that point, the fever would remit, the tongue moisten, the sordes disappear, when all at once, generally with a slight chill, the whole catalogue of aggravated symptoms would be precipitated upon him. This was repeated *three* times, simulating what is called *relapsing fever*, which I have no experience with.

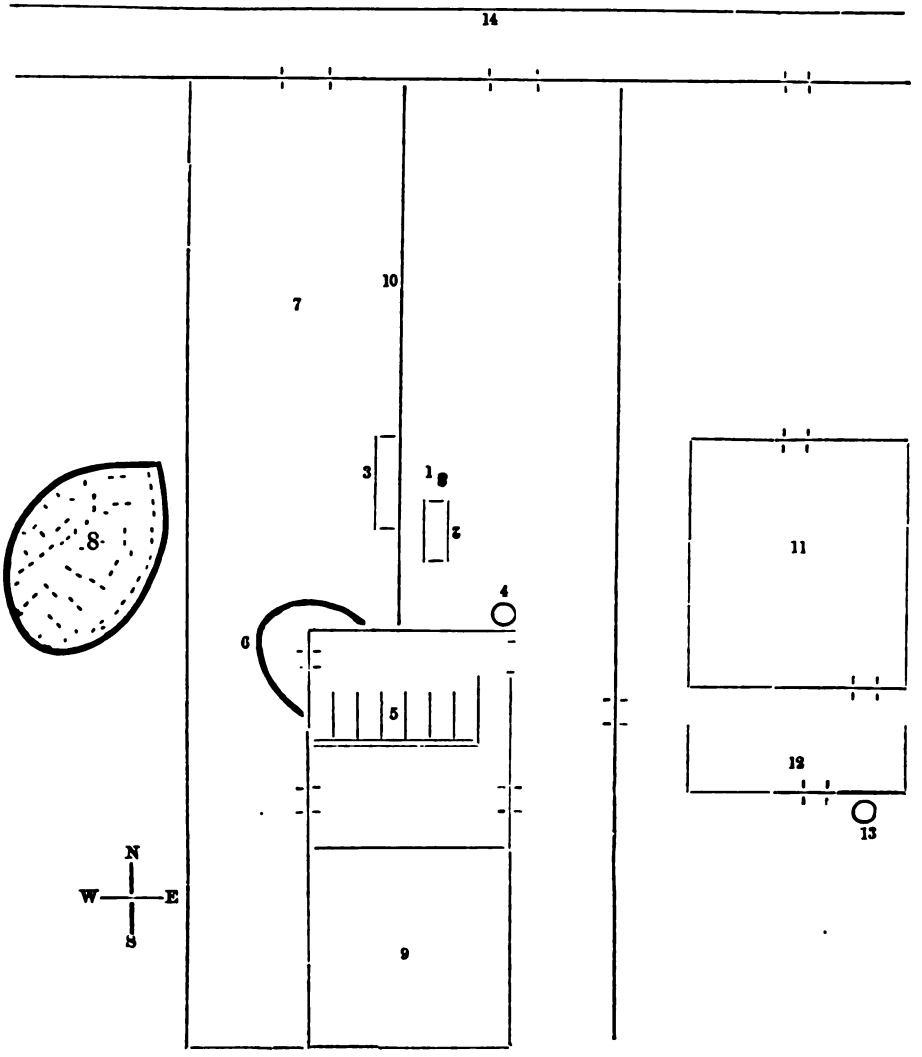
A vexatious cough, with slight rusty colored expectoration, commenced after the first week, accompanied with a little sub-crepitant *rale* at posterior and base of left lung, and some broncophony at corresponding point on right side, so that a slight double pneumonia existed as a complication, the extension of which might possibly account for those *relapsing* chills, and yet the physical signs failed to detect it.

After the last chill, during the fourth week, the boy approached as near death's door as it was possible, and would have slipped through, say the *wiseacres*, had it been *ajar*. But his time had not come, thanks to brandy and quinine, and by dint of persevering effort we brought him through, although he is having a tedious convalescence.

His father was also taken sick in a similar but modified way about a week after the boy was attacked, but was around again in two weeks. But for several years past Mr. Monfort has been troubled frequently with a follicular stomatitis, which at times has been very troublesome.

Now, to sanitarians, the most interesting question connected with these cases is *What is the cause?*

Well and Surroundings on Premises of James Monfort, in Nottawa Township, St. Joseph County, the Water from which Well is supposed to have Caused Cases of Fever simulating Typhoid Fever.



1. Well Pump.
2. Horse-trough.
3. Cattle-trough.
4. Rain-barrel.
5. Horse-stables.
6. Manure-pile.
7. Barn-yard.
8. Stagnant pond.
9. Barn, 30x40 feet.
10. Fence.
11. House.
12. Stove shanty.
13. Swill-barrel.
14. Road.

They live in the midst of a healthy locality,—clay soil, high, rolling surface, no stagnant water (except a little sink-hole a hundred feet from the well), and in a neighborhood, too, more than usually exempt from sickness, and especially from malarial sickness.

I soon satisfied myself, although a long time convincing them, that the cause of their sickness was in the well, and interdicted the use of the water. The well from which they obtained all their water was situated at the north end of the barn, 12

feet distant and at about the center of its width, a fence separating it from the barnyard running within 3 feet of it, on the opposite side of which was a trough for cattle and another on the other side for horses, extending from the pump towards the barn, around each of which was an excavation filled with animal droppings, the one presenting evidences of direct communication over the top with the well and the other only three feet distant.

The whole width of the barn at that end was used for stabling, divided into seven stalls. The manure was thrown out at the west side into the barnyard, extending around the corner to within ten feet of the well and kept almost constantly saturated with drippings from the eaves. On the east side was an eaves-trough, the water from which was received into a barrel at the corner, which when full would overflow, the water running directly into the excavation around the horse-trough, which communicated with the well.

It would seem that this well had been specially designed as a reservoir for barnyard *scourings*. And this condition of things had existed *nine years!* The well was 14 feet deep, usually about 10 feet to the surface of the water and in a clay soil, which peculiarity of soil has undoubtedly put off the evil day; and had it not been for the surface drainage over the top, they would only have become a sort of fashionable invalids for a time, and the more serious *Providential visitation* would have been delayed yet a few days more.

So thoroughly convinced was I that the water of this well was the cause of their sickness (none other appearing around the premises after careful search, unless we except a somewhat offensive swill-barrel that stood in the rear of a board shanty used in the summer for the cook-stove), that I sent a gallon of it to Prof. Kedzie of Lansing, who kindly furnished me with the following analysis, made for and by direction of the State Board of Health:—

"1,000,000 parts of water contain:—

Total solids	600 parts,
Free ammonia	15 parts,
Albuminoid ammonia	3 parts,
Hydrochloric acid	150 parts.

"Heisch's test gives a characteristic reaction for sewage contamination.

"The water is evidently unfit for use as potable water, and may have been the cause of the cases of fever described in your card."

My friend, Dr. E. Stewart, had a case of fever of a similar type, but of less severity last fall, to which I was called in consultation, which run a very long course. The surroundings and sanitary conditions in this case were all that could be desired, excepting the location of the well, which was only eight feet from a very filthy barnyard and in a sand and gravel loam. Dr. Nelson I. Packard, of Sturgis, reports to me similar cases from like causes.

Now, what are these fevers? If typhoid fever is not produced *de novo*, under proper conditions, then these could not have been *typhoids*, as there was in either case no evidence of communication from a specific contagium or virus. And yet they had the *symptoms* of typhoids, save, perhaps, the enteric, and run their course.

Respectfully submitted. H. C. CLAPP.

From the township of Bridgehampton, Sanilac county, there was reported by Dr. G. C. Vincent, Health Officer of Marion township, a case of sporadic cholera, and following it in the same family cases of malignant typhoid fever.

COMMUNICATION FROM G. C. VINCENT, M. D., HEALTH OFFICER OF MARION TOWNSHIP, SANILAC COUNTY,—A CASE OF SPORADIC CHOLERA, FOLLOWED BY CASES OF MALIGNANT TYPHOID FEVER.

DECKERSVILLE, April 4, 1879.

Secretary State Board of Health:

DEAR SIR:—Typhoid fever of a malignant type prevails at the house and with the family of J.... P....., of the township of Bridgehampton, Sanilac county. One death has occurred, three more persons are now sick. Just previous to the breaking out of this disease a death occurred in the same family taking on all the symptoms of sporadic cholera. I attribute the cause to filthy living and improper diet.

G. C. VINCENT,
Health Officer of Marion Township, Sanilac Co,

In reply to a letter from Dr. Baker asking for a statement of details of the case of sporadic cholera and of the surroundings of the family, and particu-

larly whether the drinking-water used by those who had the typhoid fever could have been contaminated by the discharges from the case of sporadic cholera, Dr. Vincent wrote, under date of April 21, 1879:—

"The case of sporadic cholera was a girl 14 years of age. I saw her first March 20, at 10 or 11 A. M. She died at 5 P. M. of the same day. She was said to have been taken March 19, in the morning. Her evacuations were said to have been emptied on the ground a number of rods northeast of the house. The land all descends to to the west, and but a few rods west from the house is a creek in which water runs only during wet seasons. A small well or spring near the creek supplies the family with water. A close cellar under the house, with little or no ventilation, and kept under lock and key, is said to contain vegetables and other articles used as food by the family. No more have died since I wrote you. The passages of the typhoid fever patient who died were covered up with rags during my absence, and on my return the stench was almost unbearable. The room is very small and dark, with little or no ventilation; the ceiling is low; the stove smokes desperately.

"The family are Canadian French, and speak bad English. It seemed impossible to impress upon their minds successfully the necessity for cleanliness. The patient of sporadic cholera had not been from home that I can learn."

All which is respectfully submitted.

HOMER O. HITCHCOCK,
Committee on Epidemic, Endemic, and Contagious Diseases.

KALAMAZOO, Oct. 14, 1879.

OPINIONS

RELATIVE TO

DUTIES AND COMPENSATION OF A HEALTH OFFICER.

—BY—

HON. LEROY PARKER,

COMMITTEE OF THE STATE BOARD OF HEALTH ON LEGISLATION IN THE INTERESTS OF PUBLIC HEALTH;

—BY—

G. CHASE GODWIN,

CITY ATTORNEY OF GRAND RAPIDS, MICH.;

AND BY

HON. OTTO KIRCHNER,

ATTORNEY GENERAL OF THE STATE OF MICHIGAN,

—ON—

QUESTIONS SUBMITTED BY THE HEALTH OFFICER AND BY THE BOARD OF HEALTH OF GRAND RAPIDS

RELATIVE TO THE APPLICATION OF SECTIONS 1693 AND 1740, COMPILED LAWS OF 1871, AS AMENDED BY THE LEGISLATURES OF 1877 AND 1879.

Prepared for publication by Hon. LeRoy Parker.

DUTIES AND COMPENSATION OF THE HEALTH OFFICER OF GRAND RAPIDS.

CORRESPONDENCE, AND OPINIONS BY G. CHASE GODWIN, LE ROY PARKER, AND HON. OTTO KIRCHNER.

The following correspondence and opinions, relative to the duties of the health officer of the city of Grand Rapids, and to the relations existing between the board of health and the common council of Grand Rapids, will be of interest to the health officers of other cities and villages in the State. It will be seen from the opinions contained in the letters of Le Roy Parker, member of the State Board of Health, that the legal duties of the boards of health of cities and villages, when these boards are provided for by the charters of such cities and villages, are twofold:—

1st. They must perform the duties prescribed by the charters under which they are organized, and by such ordinances as are in accordance therewith.

2d. They must comply with all such requirements of the State laws relative to public health, as do not conflict with the provisions of the city or village charters, under which they are organized.

COMMUNICATION FROM L. DE PUY, M. D., CITY PHYSICIAN AND HEALTH OFFICER OF GRAND RAPIDS, MICH.,—INQUIRIES RELATIVE TO THE POWERS AND DUTIES OF THE HEALTH OFFICER AND THE BOARD OF HEALTH.

81 MONROE ST., GRAND RAPIDS, MICH., Aug. 18, 1879.

Henry B. Baker, Secretary State Board of Health:

DEAR SIR:—The board of health of this city has received from you two circulars enclosing blanks to be filled and returned to your office in accordance with the laws of the State, neither of which has received the least attention from said board. The board of health is composed of three members, who receive as compensation for their services the sum of one hundred dollars per annum. They have divided our city—of forty thousand inhabitants—into three districts; and each one gives his district such attention as his salary will warrant, each one doing the entire work of his district as far as it is done. Our city is in a most deplorable condition in a sanitary point of view. Our public alleys are literally barn-yards, and the overflowing privy-vaults are numerous, besides numerous other disease-breading nuisances. The charter of the city in providing for the election of a board of health, makes "the city physician the health officer thereof." In the working of our sanitary system said officer has never had the least duty prescribed for him, or function to perform except the care of the sick, and he is literally devoid of power to abate or cause to be removed the most flagrant nuisance. His salary is fixed at $800.00, out of which he is to furnish all of his medicines. Diphtheria, measles, and scarlet fever are quite prevalent and fatal in our city. Our physicians, with but few exceptions, do not report their cases to the board of health, as the charter requires them to do; and I am told that some of them do not even furnish undertakers certificates for burial

permits. It would be impossible for the board of health or a health officer to make a sanitary or mortuary report from this city. There seems to be a feeble movement in our council to bring about a better state of things, but I am afraid it will fail for want of vital energy. In this state of things I would like to ask you or the State Board of Health a few questions, the solution of which may perhaps aid in establishing better regulations among us. Our charter makes the city physician the health officer of the board of health. The State law provides that the board of health shall appoint or elect a health officer and *shall fix his salary or other compensation.* Now in our case, the health officer being provided for them, but without prescribed duty, function, or compensation as such officer, is it, under the law, within the power of said board to fix a compensation to him for such duty? What are ordinarily—in cities with a well-regulated sanitary system—the functions and duties of the health officer? Is it believed that there is anything conflicting in our charter with the statute laws to prevent our board of health from carrying out in full the requirements of said law in regard to the health officer, except their power to appoint?

Begging your pardon for the length of my communication, and hoping for an early reply, I remain most respectfully yours, etc.,

L. DE PUY, M. D.,
City Physician.

This letter was at once referred by the Secretary of the Board to the committee on legislation in the interests of public health. A copy of the compilation of public health laws, corrected for recent amendments, and a copy of Circular 28, relative to the duties of health officers, were at once sent to Dr. De Puy by Dr. Baker, by whom also he was referred for counsel in the premises to the city attorney of Grand Rapids. Two days later the following letter was received from J. H. Jones, a member of the Grand Rapids board of health. It also was referred to the same committee. To Mr. Jones, also, were sent a copy of the "public health laws" as amended, and copies of circulars 25 and 28, relative to duties of health officers and of boards of health.

COMMUNICATION FROM J. H. JONES, MEMBER OF THE GRAND RAPIDS BOARD OF HEALTH,—POWERS AND DUTIES OF THE HEALTH OFFICER AND OF THE BOARD.

OFFICE OF BOARD OF HEALTH,
Grand Rapids, Mich., August 21, 1879.

Henry B. Baker:

DEAR SIR:—There seems to be a misunderstanding between our board of health and the city attorney as to the obligations we are under to the State Board of Health. The city attorney claims that we are not bound according to law and our charter to make returns to the State Board, while our board are of the opinion that the city attorney is wrong. There is another question we would like explained. Our charter says the city physician shall be the health officer. Now, has the board any right to elect a health officer after the provisions made in the charter giving the power to the common council? If not, can the city physician hold both offices? and if so, is he entitled to extra pay as health officer?

We would like to have you explain the full duties of the health officer, and also the workings of well-organized boards of health, and the statutory laws governing them.

Please answer all questions fully, as we are having up-hill work here. An early reply will be welcomed. Address No. 13 West Bridge St.

Respectfully, J. H. JONES.

In response to these inquiries, the following opinion was prepared by the committee, forwarded to the Secretary of the Board, and by him transmitted to Dr. De Puy:—

OPINION BY THE COMMITTEE ON LEGISLATION IN THE INTERESTS OF PUBLIC HEALTH, IN REPLY TO QUESTIONS IN PRECEDING COMMUNICATIONS.

FLINT, *August 27, 1879.*

Dr. H. B. Baker, Secretary:

SIR:—Your communication of August 20th, with enclosed letter from Dr.

L. De Puy, city physician of Grand Rapids, also your letter of August 22d with enclosure of J. H. Jones, relative to duties of health officers and other questions, is received. In reference to the first question in Mr. Jones' letter, as to the duty of local boards of health, to make reports to the State Board of Health, I think there can be no question that under sec. 8 of act No. 81, laws of 1873, the health physician and the clerk of local boards of health should make annual reports to the State Board of Health, and should report such other facts at such times as may be required by the State Board of Health. Their duty in this respect is clearly pointed out by the section referred to, which is mandatory upon them. In regard to the appointment of the health officer for Grand Rapids, I think that as their charter makes the city physician the health officer of the Board, the board of health would have no power to appoint one, as section 49 of chapter 46 of the compiled laws of 1871, as amended in 1879,* makes an exception in all cases where the charters of cities and villages contain provisions which conflict with the general law. In this case the charter would govern.

The health officer having been appointed, by virtue of the city charter, is the health officer of the board of health and must perform all the duties pertaining to that office. If the charter of Grand Rapids makes no provision for paying the health officer or fixing his compensation as a health officer, then it is the duty of the Board of Health, under section 2 of chapter 46, compiled laws of 1871, to establish his salary. Without seeing the charter of Grand Rapids, I cannot state whether any thing in it conflicts with the public acts relating to the conduct of the board of health or its health officer.

The city physician can hold both offices and should be paid for his services as health officer, as they are entirely distinct from his duties as city physician.

You have probably explained to the writers the "full duties of health officers and the workings of boards of health," so that I need not refer to this branch of their letter.

Very respectfully,

LE ROY PARKER,

Committee on Legislation.

Certain questions were afterwards submitted to the city attorney of Grand Rapids by the board of health of that city to which he gave the following reply:—

OPINION BY THE CITY ATTORNEY OF GRAND RAPIDS, ON QUESTIONS PROPOSED BY THE BOARD OF HEALTH.

To the Honorable the Board of Health of the City of Grand Rapids:—

Your health officer, L. DePuy, M. D., has conveyed to me your request for a written opinion upon the following questions:—

"1. Is the office of city physician and health officer the same office? and can the board of health fix his salary as health officer?

"2. Is the health officer bound to report to the State Board of Health?"

In answer to the first question, I say that section 4, title II., of the city charter provides that the common council shall appoint a city physician, whose duties may be prescribed by the common council. Section 1, title IX., provides for the appointment by the council of a board of health, and that the city physician shall be the health officer thereof.

At the time of the appointment of the physician the State prescribed that the physician should be the health officer, and the performance of the functions of that office is as much a part of the physician's duties as any other. It is hardly to be said technically that it is the same office, but, the duties and the rights belonging to both offices belong to the person selected as physician.

* [Printed on page 67 of this Report.]

I have examined the charter and find no provision giving power to the board of health to fix the salary of the health officer, the only thing in reference to their power in similar matters being section 11, title IX., where the board are empowered to fix the salary of the clerk by and with the consent of the common council.

In order to find power in the board to fix this salary, we should need to give the board greater power by implication than is given in cases where power is expressed. But the council has fixed the salary of the city physician, and that salary by law must pay for all the duties imposed by the charter upon the person holding the office, and if the salary is not sufficient to pay for the duties attached to the office, the council alone, if any one, has the power to appropriate more money for such service.

The board of health has not the power to fix a salary for its health officer.

To the second question: It is the duty of the health officer to make reports to the State Board. This duty is imposed by the statute of the State upon local boards not organized under the State law as well as under the general laws. This is a duty not to the city but to the State, and the legislature in passing the law seems to have made no provision for payment for such reports, evidently not supposing the matter to be sufficiently onerous to warrant the State in attaching a salary or fee to such duty.

Respectfully, G. CHASE GODWIN,
City Attorney.

The foregoing opinion of the city attorney of Grand Rapids, together with the following questions, were then submitted by Dr. DePuy, city physician and health officer of Grand Rapids, to the State Board of Health, and the following reply and opinion was given:—

QUESTIONS PROPOSED BY DR. L. DE PUY, HEALTH OFFICER OF GRAND RAPIDS, TO THE STATE BOARD OF HEALTH.

1. Are the offices of health officer and city physician in the city of Grand Rapids one and the same office? If not, is the health officer, as such, appointed by the common council, and are his duties and compensation to be prescribed by said council, according to Title III., Sec. 10, of the revised charter of the city of Grand Rapids, 1877?

2. If the offices of city physician and health officer are distinct and separate offices yet held by the same person, is not the appointment of health officer an act of the Legislature, and he, as such, entitled to "salary or other compensation," according to law? (Sections 1692 and 1693, compiled laws of 1871, as amended by act 56, laws of 1877.*)

3. Did not the legislature, by act No. 56, laws of 1877, directly provide for the payment of all duties or services performed by the health officer by "salary or other compensation?" and is it not as much the duty of the board of health to fix such compensation in the city of Grand Rapids as in any other city or village in the State?

4. In case such duty does devolve upon the board of health, and such "salary or other compensation" is fixed by it, what remedy would there be in case the common council should disallow such account after being audited by the board of health?

Most respectfully submitted for legal opinion.

L. DEPUY, M. D.,
City Physician, etc., for the Board of Health of the City of Grand Rapids, Mich.

OPINION BY LE ROY PARKER, IN REPLY TO THE FOREGOING QUESTIONS BY DR. DE PUY.

FLINT, September 13, 1879.

Dr. H. B. Baker, Lansing, Mich.:

SIR:—In reply to your letter of Sept. 11 enclosing questions of Dr. DePuy, of Grand Rapids, with opinion of city attorney upon certain questions, I would say, that my opinion that the board of health of Grand Rapids had the power to fix the salary of the health officer, was based upon the supposition that the city charter made no provision for any compensation to such an officer.

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*[Printed on pages 66 and 67 of this Report.]

Since receiving a copy of the charter of Grand Rapids from you, I find that the charter makes provision for the council to prescribe the compensation of all officers appointed by them (title III., section 10, subdivision 27); and section 4, title II. provides for the appointment by the council of a city physician; and section 1, title IX., provides that the city physician shall be the health officer of the board. Hence the health officer is an appointee of the council, whose compensation the council has power to prescribe.

Sections 1693* and 1740*, compiled laws of 1871, as amended in 1877 and 1879, provide that boards of health shall appoint health officers and fix their compensation, except when the case comes within the exception made by section 1740, compiled laws, as amended by the laws of 1879, which is that "the provisions of this chapter [46] and the amendments thereto, shall as far as applicable, apply to all cities and villages in this State, and all duties which are * * to be performed by the board of health of townships, or by the officers, etc., shall in like manner be performed by the board of health, of such cities, etc., *excepting in cases where, the charters of such cities, etc., contain provisions inconsistent herewith.*"

The provision in the charter for prescribing the compensation of the health officer by the council is inconsistent with the general statute authorizing boards of health to fix this compensation; hence it follows that the charter provisions must govern rather than the general law. I therefore fully agree with the city attorney that the common council alone has the power to prescribe the compensation of the health officer of the board of health of Grand Rapids.

I do not however agree with the city attorney that the fact of uniting the two officers, *i. e.*, health physician and health officer, in the same person makes the offices one and the same, although the council have the right to fix a compensation which shall cover his services in both capacities. The general law requires certain duties of him as health officer which it cannot require of him as city physician, and the council may prescribe his duties as city physician, such as attending the sick among the city poor, which would not be a part of his duties as health officer. The State in prescribing certain duties for health officers, whether appointed by boards of health or by city or village councils, unquestionably intended that their compensation, whether fixed by the boards of health or by the councils, should be paid by the city, village, or township of which they are health officers, and whatever compensation they may receive must cover the item of making reports to the State Board of Health.

My answers to the questions submitted by Dr. DePuy are therefore as follows:—

1. The offices of health officer and city physician are distinct and separate offices. They are both appointed by the common council of Grand Rapids. The council alone can fix the compensation for either office. The council can prescribe the duties of either officer, but the health officer, in addition to the duties prescribed by the council, must perform such duties as are required by the general law.

2. Unquestionably the health officer is entitled to pay for his services, but if the council see fit to make his salary as city physician cover his official duties as health officer, it is a matter wholly within the control of the council.

3. The legislature by act No. 56, laws of 1877, provided for the payment of all duties or services performed by health officers, to be fixed by the boards of health; but the amendment of section 1740, compiled laws of 1871, made

* [Printed on pages 66 and 67 of this volume.]

in 1879, expressly excepts from the operation of the general law, cities and villages whose charters contain provisions inconsistent therewith. If the charter of the city of Grand Rapids made no provision for the appointment of a health officer, or for his compensation, it would clearly be the duty of the board of health to appoint such officer and fix his compensation.

If the health officer performs duties requiring compensation, for which the charter makes *no provision*, then it would be the duty of the board of health to establish such compensation. Section 1740 only excepts from the operation of the general law such acts as are provided for by city and village charters and which provisions are inconsistent with the general law.

It seems to me that this matter is one susceptible of easy adjustment between the board of health and the council of Grand Rapids if both bodies have an understanding of the intent and spirit of the law, and possess the desire to see efficient measures concerning public health carried out.

Yours, etc., LEROY PARKER.

All of the foregoing correspondence was afterwards, in accordance with the request of Dr. De Puy and the advice of the committee, submitted by Dr. H. B. Baker, Secretary of the State Board of Health, to Hon. Otto Kirchner, Attorney General, for his opinion. The following is the reply of the Attorney General:—

OPINION BY HON. OTTO KIRCHNER, ATTORNEY GENERAL, CONCERNING THE FOREGOING OPINION BY MR. LEROY PARKER.

DETROIT, Oct. 8, 1879.

Dr. Henry B. Baker, Secretary State Board of Health, Lansing, Mich.:

DEAR SIR:—In reply to your favor of September 18, I beg to say that I agree entirely with the opinion of Mr. Le Roy Parker.

Very respectfully,

OTTO KIRCHNER.

A copy of the opinion by Mr. Parker and of that by the Attorney General were together forwarded by the Secretary of the Board to Dr. De Puy.

The foregoing correspondence, questions, and opinions are respectfully submitted.

LE ROY PARKER,
Committee on Legislation in the Interests of Public Health.

RELATIVE TO THE

DISEASES IN MICHIGAN DURING THE YEAR 1878;

INCLUDING

A SUMMARY FOR THE STATE,

AND THE REPLIES BY

CORRESPONDENTS OF THE STATE BOARD OF HEALTH,

To Circular No. 29, Issued by the Board.

COMPILED IN THE OFFICE OF THE SECRETARY OF THE BOARD.

DISEASES IN MICHIGAN IN THE YEAR 1878.

The subject of the diseases in Michigan, which has been treated for the years 1875, 1876, and 1877 in the last three Annual Reports of the State Board of Health, is here continued, for the calendar year 1878. As for each of the previous years mentioned, a circular was issued to the regular correspondents of the Board asking for information concerning the sickness and deaths in their several localities during the year, and concerning meteorological conditions, water-supply, and other conditions, coïncident and antecedent, which may be supposed to influence the rate of sickness or of deaths. The circular (29) is printed in smaller type on pages 150–176 of this Report, each question being, for convenience in studying the summary of replies, immediately followed by a summary of the replies received in answer to it.

The circular was issued January 27, 1879, and is quite similar to those previously issued. Questions 19–24, however, which relate to cases of yellow fever or of sickness in any way simulating yellow fever, were not contained in any of the previous circulars. Replies were received to this circular from 46 correspondents, in 44 localities. These replies are printed on pages 179——; a summary of the replies to most of the questions is printed, in the larger type, on pages 150–179 of this Report, the divisions of the summary alternating with the questions to which they relate.

The answers to many of the questions were of necessity estimates, and the summaries of the replies are therefore somewhat indefinite. It is believed, however, that the concurrence of well-considered and independent estimates affords strong probability of truth; and that those who cultivate the habit of making such estimates acquire the power of making them with a high degree of accuracy. The value of such a compilation as is here given depends, of course, both on the accuracy of the replies and on the number of localities represented. In acknowledging the services, therefore, of those correspondents who have replied to the circular, it seems proper to express the hope that, for the sake of increasing the value of future compilations of this kind, a still greater number of the correspondents of the Board may be willing to contribute the time and labor necessary to make a satisfactory reply. A little thought given to the subject during the year, and a few memoranda made when important facts are fresh in mind, will make it a comparatively easy task to write out answers to most or all of the questions in the circular. The circular and the summary are as follows:—

[29.] CIRCULAR TO CORRESPONDENTS, RELATIVE TO DISEASES IN MICHIGAN IN 1878.

OFFICE OF THE STATE BOARD OF HEALTH,
LANSING, MICHIGAN, January, 1879.

To the Correspondents of the State Board of Health:

GENTLEMEN:—This Board desires to have, and to place upon record for purposes of future study in connection with records of deaths and of meteorological conditions, statements, for as many different localities in the State as possible, of the diseases in Michigan during the year 1878. Will you have the kindness to send, as soon as is convenient, your replies to the following questions? So far as exact and generally accepted common terms can be used, it is desirable to avoid the use of technical terms. Please use the stamped envelope enclosed herewith, and leave all additional postage to be paid at this office. In replying, it will not be necessary to repeat the questions, but simply to refer to the Circular, and to each question by number.

1.* If you live in a city or incorporated village, what do you estimate the number of inhabitants of said city or village at the middle of the year 1878?

2. Among these inhabitants above mentioned, what do you estimate the number of deaths from all causes during the year 1878?

Questions 1 and 2 were asked with especial reference to cities and incorporated villages; but several replies were received from other localities. Replies were received to both these questions, giving a known or an estimated number of deaths for a known or an estimated population, from 39 of the 44 localities from which replies to the circular were received. From 27 cities and incorporated villages, having a total population of 264,950 inhabitants, 3,581 deaths were reported, an annual death-rate of 13.5 per thousand. From 12 other localities, having a total population of 20,917 inhabitants, 168 deaths were reported, an annual death-rate of 8 per thousand. From the whole 39 localities from which the population and deaths were reported, there was reported a total population of 285,867, with 3,749 deaths, an annual death-rate of 13.1 per thousand. The highest death-rate reported was in the village of Cassopolis, 25 per thousand; the lowest was in the unincorporated village and in the township of Port Sanilac, 3.7 per thousand. For 1877, 28 localities reported a total population of 218,980, with 3,393 deaths, an annual death-rate of 15.5 per thousand. The average death-rate for the two years in all the localities reporting is 14.1 per thousand. The highest death-rate reported for 1877 was 40 per thousand; the lowest, 1 per thousand. As anticipated, the replies to this question for 1878 are more complete than those for 1877.

3. Please state the territory for which your replies to the following questions are made.

All of the 46 correspondents who replied to the circular answered this question, stating quite definitely for what territories their replies were made. The

* The figures beginning paragraphs are the numbers of the questions in Circular 29, herewith printed in smaller type on pages 150-176 of this Report. The replies, from which the summary is made, are printed on pages 179-....

44 localities represented include 14 incorporated cities, 19 incorporated villages, 11 unincorporated villages, and a large amount of territory adjacent to these. They are situated in 26 counties, and in 7 of the 11 geographical divisions of the State, which have been made to facilitate the study of the causes of sickness and of deaths in various parts of the State. A list of these divisions and of the counties included in each division is printed on page 153.

4. Among the people of your locality, considering the increase or decrease of population, was the amount of ***sickness*** from all causes during the year ending Dec. 31, 1878, ***greater, less,*** or about ***the same as the average*** during previous years? If not the same, how much was it increased or diminished?

In answer to this question, 19 correspondents stated that the amount of sickness from all causes during the year 1878 was less than the average for previous years; 17 stated that it was about the same as the average; 8, that it was greater than the average; 1 stated that it was 20 per cent less than in 1877; and 1, that it was considerably less than in 1877. Of the 19 who stated that the amount of sickness was less than the average, 13 stated how much less they think it was,—the range being from 10 per cent less to 66 per cent less, and the average decrease reported by them being 30 per cent; one stated that it was somewhat less; one, that it was less in spring and summer, greater in fall, on the whole diminished. Of the 17 who stated that it was about the same as the average, one said that it was "about the same as the 3 preceding years." Of the 8 who stated that the amount of sickness was greater than the average, one said that it was 8 per cent greater; 3, that it was 25 per cent greater; one, that it was about two-thirds greater,—an average increase of 30 per cent; one stated that it was "a little greater, perhaps." It is hardly probable that in the 8 localities from which the amount of sickness was reported greater than the average of previous years, the increase was equal to the decrease in the 19 localities from which the amount of sickness was reported less, in 13 of which the average decrease was 30 per cent. A comparison of this summary with that of the replies to the same question for 1876, page 169 of the Fifth Annual Report, and for 1877, on page 110 of the Sixth Annual Report, would seem to indicate, so far as the localities from which replies are received represent the State, that the amount of sickness in Michigan in 1878 was about the same that it was in 1876 and 1877, when it seemed to be less than the average of preceding years, though not so noticeably less as in 1875. It is worthy of notice that in 5 of the 8 localities from which more than the usual amount of sickness was reported for 1878, the disease or one of the diseases of increased prevalence was diphtheria, in three of them it was the only one reported. From 9 of the 19 localities from which less than the usual amount of sickness was reported for 1878, various malarial diseases were reported less than usually prevalent. From these 19 localities no other diseases were so frequently reported as of lessened prevalence in 1878.

5. Compared with previous years, and from all causes, was the ratio of ***deaths*** to inhabitants during the year 1878, ***greater, less,*** or about ***the same as the average?*** If not the same, how much was it increased or diminished?

In answer to this question, 17 correspondents stated that the ratio of deaths to inhabitants in 1878 was less than the average,—one of them saying that it was "greater in the village, but less in the whole territory"; 20 stated that it was about the same as the average,—one of them saying that it was an

average with 1875, 1876, and 1877, and one that it was about an average with the amount of sickness; 7 stated that it was greater than the average, and two made no statement. Of the 15 who stated that the ratio of deaths to inhabitants in 1878 was less than the average, one stated that it was somewhat less; one, that it was 1.5 or 2 per thousand less; and 9 stated the actual or an estimated per cent by which the ratio of deaths to inhabitants was diminished in 1878,—the range being from 10 per cent less, to 75 per cent less, and the average decrease reported by them being 30 per cent. Of the 7 who stated that the ratio of deaths to inhabitants in 1878 was greater than the average, one stated that it was a little greater; one, that it was greater by 1.48 per thousand inhabitants; and 4 stated the actual or an average per cent by which the death-rate was increased,—the range being from 9 per cent greater to 66 per cent greater, and the average increase reported by them being 33 per cent. It is again worthy of note that in 5 of the 7 localities from which an increase in the death-rate was reported for 1878, diphtheria is one of the diseases (and in three of them the only disease) from which an increased mortality was reported.

6.* What diseases, or causes of death, were ***more*** prevalent in 1878, than usual in previous years?

In reply to this question, 12 correspondents stated no disease or cause of death was more than usually prevalent. By the other 33 correspondents who replied to the circular, the following diseases and causes of death were reported as more than usually prevalent during the year 1878:—

Diphtheria, by 15; consumption, by 7; scarlet fever, by 6; whooping-cough and typhoid fever, each, by 3; old age, influenza, and pneumonia, each, by 2; various other diseases, each, by 1.

In reply to this question (6) in the circular for 1877, scarlet fever and diphtheria were reported each by 6 correspondents as having been more than usually prevalent in 1877, a greater number than reported any other disease unusually prevalent for that year. A tabular view of the replies to question 6 is given in Exhibit 2, pages 154–5.

7. If you can assign any ***cause for*** the ***unusual prevalence*** of any disease, please do so.

In answer to this question, 17 correspondents made no statement, 11 of them having stated, in answer to question 6, that no disease or cause of death was more than usually prevalent; 10 stated that they could assign no cause for increased prevalence of diseases reported. Among the causes of increased prevalence of different diseases reported by the other 8 correspondents, various unfavorable climatic conditions were mentioned by 6 correspondents, all of them specifying the great heat of the summer; contagion was mentioned by 5 as a cause of the unusual prevalence of diphtheria, and by 3 as a cause of the unusual prevalence of scarlet fever; three of them mentioned also carelessness and disregard of the contagiousness of diphtheria from disbelief that it is contagious; a third mentioned non-isolation of patients. A tabular abstract from the replies to this question is given in Exhibit 2, pages 154–5.

8. (*Question 8 follows Exhibits 1, 2, and 3, on page 158.*)

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* The figures beginning paragraphs are the numbers of the questions in Circular 29, printed in smaller type on pages 150–176 of this Report. The replies, from which the summary is made, are printed on pages 179–....

EXHIBIT 1.—*Eleven Geographical Divisions of the State, formed for the purpose of facilitating the Study of Causes of Sickness and of Deaths, with a List of Counties included in each Division.*

1. Upper-Peninsular.	2. North-western.	3. Northern.	4. North-eastern.	5. Western.	6. Central.	7. Northern-Central	8. Bay and Eastern.	9. South-western.	10. Southern-Central.	11. South-eastern.
Baraga.	Benzie.	Antrim.	Alcona.	Kent.	Barry.	Clare.	Bay.	Allegan.	Branch.	Macomb.
Chippewa.	Gr. Traverse.	Charlevoix.	Alpena.	Lake.	Clinton.	Gladwin.	Huron.	Berrien.	Calhoun.	Monroe.
Delta.	Leelanaw.	Cheboygan.	Iosco.	Mason.	Eaton.	Isabella.	Lapeer.	Cass.	Hillsdale.	Oakland.
Houghton.	Manistee.	Crawford.	Ogemaw.	Muskegon.	Genesee.	Mecosta.	Saginaw.	Van Buren.	Jackson.	Wayne.
Isle Royal.	Manitou.	Emmet.	Presque Isle.	Newaygo.	Gratiot.	Midland.	Sanilac.		Kalamazoo.	
Keweenaw.	Missaukee.	Kalkaska.		Oceana.	Ingham.	Roscommon.	St. Clair.		Lenawee.	
Mackinac.	Wexford.	Otsego.		Osceola.	Ionia.		Tuscola.		St. Joseph.	
Marquette.				Ottawa.	Livingston.				Washtenaw.	
Menominee.					Montcalm.					
Ontonagon.					Shiawassee.					
Schoolcraft.										

The replies by correspondents are grouped by geographical divisions of the State, shown in this exhibit, and alphabetically by localities within the divisions. This exhibit is printed here in order to aid in turning to replies from particular localities, without referring to the index, and that reference may readily be made to it, by page, from the exhibits which follow.

The weekly reports of diseases for the year ending December 28, 1878, the compilation of which is printed in this volume, are also compiled with reference to these geographical divisions.

EXHIBIT 2.—*Indicating by Geographical Divisions of the State and by Localities, the Diseases of Increased and of Lessened Prevalence in Michigan during the year 1878, and the Supposed Causes of Increased and of Lessened Prevalence, as Compiled from the Replies of 46 Correspondents to Questions 6, 7, 8, and 9, of Circular 29 from the State Board of Health.*

Divisions* and Localities.	Diseases of Increased Prevalence.	Supposed Causes of Increased Prevalence.	Diseases of Lessened Prevalence.	Supposed Causes of Lessened Prevalence.
All Localities.	See Summary of Replies to Question 6, page 152.	See Summary of Replies to Question 7, page 152.	See Summary of Replies to Question 8, page 158.	See Summary of Replies to Question 9, page 158.
UPPER-PENINSULAR*				
Houghton	Scarlatina and typhoid fever	Of typhoid fever the excessively warm and open winter, and the hot summer, favoring decomposition.	Cholera infantum	Can give no reason.
WESTERN.*				
Drenthe	None		Malarial diseases	Drainage.
Grand Haven	Bronchitis, pneumonia, and consumption.	Cannot say	Typho-malarial fever and cholera infantum.	The uniform temperature throughout the greater part of the year.
Grand Rapids	Diphtheria and whooping-cough.		Measles and scarlet fever.	
Rockford	Diphtheria	Epidemic, mainly	Diphtheria	Generally healthy season, with few or no epidemics.
CENTRAL.*				
DeWitt	Diphtheria	Contagion, and non-isolation of patients.	Whooping-cough	Lack of contagion, and immunity acquired by its prevalence in 1877.
Elsie	Scarlatina	Cannot say	Typho-malarial fever	To strict sanitary measures.
Howell	Intermittent fever and remittent fever.	Cannot say	Scarlatina and diphtheria	Not epidemic.
Ithaca	Diphtheria	Cannot, except damp, open winter of 1877-8.	None.	
North Lansing	Diphtheria, puerperal fever, influenza, and pneumonia.		Typhoid fever	Can give no reason.
Otisville	Diphtheria and diarrhea	Disregard of contagiousness of diphtheria, and undefined atmospheric conditions; a mitigation of the disease observed during prevalence of a north wind; of diarrhea, the extreme heat of summer.	Intermittent fever, typhoid fever, typho-malarial fever, and pneumonia.	Of the fevers, atmospheric conditions; of pneumonia, the extreme mildness of early months.
St. Johns	None.			
Webberville	Small-pox	Contagion	Bronchitis and pneumonia	Cannot say.
BAY AND EASTERN.*				
Bay City	Consumption	Close houses and damp ground.	Miasmatic fevers and croup	No epidemic, and a better state of living.
Lapeer	None		Intermittents and other malarious affections.	Improved sanitary condition of the city; drainage of low lands contiguous to the city.
Port Sanilac	Paralysis	Cannot say	Typhoid fever	Healthy season, and observation of sanitary measures.
Saginaw	Diphtheria	Carelessness, many believing that it is not contagious.	Accidents, cholera infantum, consumption, and diarrhea.	Healthy season.
Thornville	Influenza	Cannot say	The contagious diseases and pneumonia.	Of contagious diseases, lessened exposure.
SOUTH-WESTERN.*				
Allegan	Diphtheria.			
Cassopolis	Diphtheria	Cannot say	Scarlet fever	Cannot say.
Dayton	Scarlet fever and diphtheria	Contagion from other localities.	Consumption and dysentery	Favorable climatic and improved sanitary conditions.
Mattawan	Cancerous diseases, chronic Bright's disease, diseases of the nervous system.	Cannot say	All diseases influenced by malarial influences.	Dry soil throughout major part of the year.

Niles[1]	Consumption or lung diseases	Cannot say	Typhoid fever.	
Niles[2]	Old age, leukaemia, apoplexy, carcinoma, chronic metritis, and consumption.	Cannot say	Eruptive fevers, malarious fevers, and unfavorable weather.	Absence of epidemic and malarious influences; favorable weather.
Otsego	None		Typho-malarial fever, epidemic diseases, remittent fevers.	Greater exertion to prevent spread of epidemic diseases, and plainer living on account of hard times.
St. Joseph	Diseases peculiar to old age	People have grown old with the country.	Consumption and contagious diseases.	Of consumption, the previous mild Winter.
SOUTHERN-CENTRAL.*				
Adrian	None.			
Brooklyn	Diphtheria	The excessive heat and dryness of July, Sept., and Oct., by reducing the system, rendered it more susceptible to the disease.		
Hillsdale	Diphtheria and scarlatina, also fevers and bilious troubles.	Of fevers and bilious troubles the wet spring, and early summer, and very hot weather; of diphtheria and scarlatina, cannot say.	All others, *i. e.*, diarrheas, dysenteries, etc.	
Hudson	Intermittents	Cannot say	Scarlatina, diphtheria, and typhoids.	Cannot say.
Jackson	Diphtheria and whooping-cough.		Other zymotic diseases generally.	Cannot say.
Kalamazoo	Not any		Dysentery, typhoid fever, and diphtheria.	Increased use of Holly water.
Mendon	None		None, except malarial diseases, which have been less prevalent during the past 4 or 5 years, but about the same during 1878 as during that period.	Drainage of marshes and low lands.
Sturgis	None		None.	
Three Rivers	Consumption, diphtheria, and scarlet fever.	Diphtheria and scarlet fever imported.	Malarial	Dry soil in the fall, and drainage of marshes near the village.
Union City	Old age and consumption		Miasmatic	Less miasm and better hygienic conditions.
Vicksburg	Consumption		Dysentery.	
Ypsilanti	None	Intermittent fevers prevail owing to early vegetation and moisture of the soil.	Small-pox.	
SOUTH-EASTERN.*				
Detroit[3]	None		Epidemic diseases	Better drainage.
Detroit[4]	Whooping-cough and sore-throat	Whooping-cough had not been prevalent for some time.	All, except whooping-cough and sore-throat.	Better sanitary condition. Possibly the hard times by compelling people to live on plainer food.
Milford	Diphtheria, typhoid fever, and sun-stroke.	Of sun-stroke, the excessive hot weather.	None.	
Northville	None		Diphtheria, and typhoid type of fevers, less than for two previous years.	
Pontiac	None		None.	
Trenton	Malarial diseases and scarlet fever.	Contagion of scarlet fever	None.	
Washington	Erysipelas and septicæmia	Can assign no cause but low vitality.	Malarial diseases, scarlatina, diphtheria, diarrhea, dysentery, and pneumonia.	Cannot say.
Wyandotte	Consumption and typhoid fever	Unusual heat and moisture of the summer.	The contagious exanthemata generally.	

* For counties in each division, see Exhibit 1, page 153.

[1] S. Belknap, M. D. [2] J. S. Reeves, M. D. L. Connor, M. D. [4] W. H. Rouse, M. D.

EXHIBIT 3.—*Indicating, by Localities in Michigan, the Diseases from which there was Increased Mortality, the Diseases from which there was Lessened Mortality, during the Year 1878, and the Supposed Causes of Increased and of Lessened Mortality,—As Compiled from the Replies of 39 Correspondents to Questions 10, 11, 12, and 13 in Circular 29 from the State Board of Health.*

Divisions* and Localities.	Diseases of Increased Mortality.	Supposed Causes of Increased Mortality.	Diseases of Lessened Mortality.	Supposed Causes of Lessened Mortality.
All Localities.	See Summary of Replies to Question 10,—page 158.	See Summary of Replies to Question 11,—pages 158-9.	See Summary of Replies to Question 12,—page 159.	See Summary of Replies to Question 13,—page 159.
UPPER-PENINSULAR*				
Houghton	Scarlatina and typhoid fever	From typhoid fever, the warm and open winter and the hot summer favoring decomposition.	Cholera infantum	Cannot say.
WESTERN.*				
Grand Haven	Bronchial consumption	Cannot say	Pneumonia and whooping-cough	The mild weather and less than usual malarial complications.
Grand Rapids	Diphtheria		Measles and scarlet fever.	
Rockford	Mortality less		Scarlet fever and diphtheria	Sanitary measures.
CENTRAL.*				
De Witt	Diphtheria	Prevalence of contagion	Whooping-cough	Its lessened prevalence.
Elsie	Scarlatina	Cannot say	Typho-malarial fever	Enforcing sanitary measures.
Howell	Typhoid fever and pulmonary consumption.	Cannot say	Scarlet fever and diphtheria	Not epidemic.
Ithaca	Diphtheria	Cannot say	None.	
North Lansing	More deaths from diphtheria than in other years, but not in proportion to number of cases.			
Otisville	Diphtheria and diarrhea	Of diphtheria, neglect to procure medical aid at attack and remission of attention during convalescence; of diarrhea, extreme heat and teething.	Fevers and pulmonary diseases	Lessened humidity of atmosphere.
Webberville	None, except small-pox	Cannot say	Pneumonia and bronchitis	Fewer cases and mild type.
BAY AND EASTERN.*				
Bay City	No uncommon diseases		No uncommon diseases.	
Lapeer	Can think of none		From the exanthematous fevers and diphtheria.	Mildness of the endemics named.
Port Sanilac	Consumption	Cannot say.		
Saginaw	None, except diphtheria	Cannot say	Nearly all diseases	Healthy season.
SOUTH-WESTERN.*				
Cassopolis	Diphtheria	Cannot say.		
Dayton	Diphtheria	Malignancy of the type	Bowel complaints	Favorable climatic conditions.
Niles [1]	Consumption or lung diseases	Cannot say	Typhoid fever	Cannot say.
Niles [2]	Apoplexy, consumption, carcinoma, chronic metritis, chronic gastro-duodenitis, and asthma.	Cannot say.		
Otsego	None		Scarlet fever, measles, and bilious remitting fevers were light.	No theory.
St. Joseph	Diseases peculiar to old age		Consumption and malarious diseases.	To the mild winter. Less malaria every year.

Thornville	None		Contagious diseases and pneumonia.	To their lessened prevalence.
SOUTHERN-CENTRAL.*				
Brooklyn	Excessive heat and dryness in July, Aug., and Sept.	Excessive heat and dryness in July, Aug., and Sept., also unsanitary conditions.		
Hillsdale	Diphtheria and scarlatina	Cannot say. More fatal in cold or cool weather than in warm weather.	No death from puerperal fever or child-birth. Few births. Nearly all the deaths from children or quite young or quite old people.	Cannot say.
Hudson	None.			
Jackson	None		Zymotic diseases generally, except diphtheria and whooping-cough.	
Kalamazoo	None		Dysentery, typhoid fever, and diphtheria.	Greater use of Holly water.
Mendon	None		None.	
Sturgis	None.			
Three Rivers	Consumption, diphtheria, and scarlet fever.	None specially.		
Union City	Consumption		Continued fever	Cases of mild type.
Ypsilanti	Pulmonary consumption	Humidity of the atmosphere	Small-pox	Not having any.
EASTERN.*				
Detroit[3]	Apoplexy, old age, scarlatina, and whooping-cough.	Probably accidental; no epidemic.	Diseases of the brain, convulsions, cholera infantum, diarrhea, dysentery, typhoid fever, measles, and small-pox.	From cholera infantum, diarrhea, dysentery, and typhoid fever to favorable season and change of location of the receiving basin of the water-works; from convulsions, in part, to improvement in water-supply; from small-pox, to vaccination.
Milford	Diphtheria, typhoid fever, and sun-stroke.	Cannot say.		
Northville	Whooping-cough with croup, neuralgia of heart, and congestive chill.		Old age, sudden death, and typhoid fever.	Typhoid fever did not prevail.
Pontiac	None		None.	
Trenton	Scarlet fever	Cannot say	Typhoid fever	Perhaps to better drainage.
Washington	Erysipelas, septicæmia, and meningitis.	Low vitality and epidemic influences.	Malarial diseases, scarlatina, diphtheria, diarrhea, dysentery, and pneumonia.	
Wyandotte	Consumption and typhoid fever	Depressing effects of the peculiarities of the summer.	Contagious exanthemata	Non-prevalence of the disease.

* For counties in each division, see Exhibit 1, page 153.

[1] S. Belknap, M. D. [2] J. S. Reeves, M. D. [3] W. H. Rouse, M. D.

8.* What diseases, or causes of death, were *less* prevalent in 1878, than usual in previous years?

In reply to this question, 5 correspondents stated that no disease or cause of death was less than usually prevalent; 4 made no statement. By the other 36 correspondents who replied to the circular, the following diseases and causes of death were reported as less than usually prevalent during the year 1878:—

Malarial diseases, by 7; diphtheria and typhoid fever, each by 6; scarlet fever, by 5; typho-malarial fever and pneumonia, each by 4; cholera infantum, consumption, contagious diseases, diarrhea, and malarial fevers, each by 3; epidemic diseases, by 2; all except whooping-cough and sore throat, by 1; zymotic diseases generally, other than diphtheria and whooping-cough, by 1; various other diseases and causes, each by one.

Of the 6 localities from which diphtheria was reported less than usually prevalent, from one 4 cases were reported in answer to question 16; from one, 6 cases; from one no statement was received concerning the disease in answer to question 16; from the other 3 it was reported that there was no case. A tabular abstract from the replies to question 8 is given in Exhibit 2, pages 154–5.

9. To what do you attribute the lessened prevalence?

In answer to this question, 16 correspondents made no statement, 5 of them having stated, in answer to question 8, that no disease or cause of death was less than usually prevalent; 7 stated that they could assign no cause for decreased prevalence of diseases reported. Among the causes of decreased prevalence of different diseases reported by the other 23 correspondents who replied to the circular, favorable climatic conditions were reported by 5 correspondents; drainage and dryness of the soil, by 6; greater use of Holly water, by 1; other favorable sanitary conditions, by 14. A tabular abstract from the replies to this question is given in Exhibit 2, pages 154–155.

10. From what diseases or causes was there *more* than the usual mortality during the year 1878?

In answer to this question, 7 correspondents made no statement; 10 stated that from no disease or cause was there more than the usual mortality during the year 1878; one, that the mortality was less, not, however, stating from what diseases the mortality was less, or that it was not greater from any disease; by the other 28 correspondents the mortality from the following named diseases and causes of death was reported as greater in 1878 than usual:—

From diphtheria, by 11 (one of them stating that the mortality was not greater in proportion to the number of cases); from consumption, by 9; from scarlet fever, by 6; from typhoid fever, by 4; from apoplexy, by 2; from various other diseases and causes, each, by 1.

A tabular abstract from the replies to question 10 is given in Exhibit 3, pages 156–157.

11. If you can assign any *cause for* the *unusual mortality* from any disease, please do so.

In answer to this question, 23 correspondents made no statement, 10 of them having stated, in answer to question 10, that from no disease or cause was there unusual mortality; 13 stated that they could assign no cause for the unusual

*The figures beginning paragraphs are the numbers of the questions in Circular 29, printed in smaller type on pages 150–176 of this Report. The replies, from which the summary is made, are printed on pages 179–....

mortality reported; unfavorable climatic conditions were reported by 5 correspondents as causes of unusual mortality; various other causes were stated by 6 correspondents. A tabular abstract from the replies to this question is given in Exhibit 3, pages 156–157.

12. From what diseases or causes was there *less* than the usual mortality?

In answer to this question, 4 correspondents stated that from no disease or cause was there less than the usual mortality during the year 1878; 16 made no statement; by the other 26 the mortality from the following diseases was reported as less in 1878 than usual:—

From diphtheria, by 5; from typhoid fever, by 5; from dysentery, measles, and pneumonia, each by 3; from cholera infantum, diarrhea, small-pox, whooping-cough, malarial diseases, and contagious diseases, each by 2; from nearly all, by 1; from zymotic diseases generally, except diphtheria and whooping-cough, by 1; from various other diseases, each by one.

A tabular abstract from the replies to question 12 is given in Exhibit 3, pages 156–7.

13. To what do you attribute the lessened mortality?

In answer to this question, 23 correspondents made no statement, 4 of them having stated, in answer to question 12, that from no disease or cause was there less than the usual mortality; 4 stated that they could assign no cause for the lessened mortality reported. Among the reported causes of lessened mortality from different diseases, favorable climatic conditions were reported by 5 correspondents; the lessened prevalence of certain diseases, by 5; enforcement of sanitary measures, by 2; improved water-supply, by 1; greater use of Holly water, by 1; various other causes, by 7. A tabular abstract from the replies to this question is given in Exhibit 3, pages 156–7.

14. Please give names, and mention dates of the occurrence in 1878, of any and all diseases attended with an *unusually high or low rate of mortality*, and state whether the rate was high or low.

In answer to this question, 12 correspondents stated that during the year 1878 no disease which occurred in their localities was attended with an unusually high or an unusually low rate of mortality; 9 made no statement. The following diseases were reported as having been attended with an unusually high rate of mortality:—

Diphtheria, by 6 correspondents,—in January by 1; in March and April, by 1; July 20 to December 10, by 1; in October, November, and December, by 1; January 14 to February 10, also November 5 to December 28, by 1; in Winter and Spring, by 1; typhoid fever, in September, October, and November, by 2 correspondents; August 9 to October 1, by 1; consumption, in Spring months, by 1; erysipelas in April, meningitis in March, septicæmia in May, all by 1; scarlet fever, in Winter and Spring, by 1.

The following diseases were reported as having been attended with an unusually low rate of mortality:—

Dysentery, by 4 correspondents,—the entire year, by 1; in July and August, by 1; at time not stated, by 2; scarlet fever, by 3,—in January, February, March, and April, by 1; the entire year, by 1; at time not stated, by 1; diarrhea, at time not stated, by 2; diphtheria by 2,—the entire year, by 1; early in the year, by 1; pneumonia, by 2,—in February and March, by 1; in April, November, and December, by 1; bronchitis, in February and March, by 1; bowel complaints in July and August, cholera

morbus and remittent fever at time not stated, typho-malarial fever in October, November, and December, meningitis in March, and pulmonary difficulties in February, March, and April, each by 1.

One correspondent stated that there were many more deaths than usual from diphtheria, but only a small proportion of deaths for the number of cases; one, that the mortality from the sickness of August, September, and October was less than usual, because diseases ran light; one, that diphtheria, scarlet fever, and whooping-cough were mild as a rule; one, that there was a low rate of mortality throughout the entire year, from continued fever dependent on miasm, and from diseases of zymotic origin.

15.* Please give names, and mention dates of the occurrence in 1878, of any and all ***diseases not usually occurring in your locality.***

In reply to this question, 13 correspondents stated that during the year 1878 no disease occurred which does not usually occur in their localities; one said, "Nothing, unless diphtheria;" one, "None except scarlet fever;" one said, "We have our share of everything"; 14 reported names of unusual diseases, 4 of them, however, not stating the time of occurrence of the unusual diseases; 11 made no statement. The following diseases were reported as having occurred in localities where they do not usually occur:—

Diphtheria, by 7 correspondents,—in January, by 3,—in February, by 1,—in March by 3; in April, by 2; in May, by 1,—in June, by 2,—in July, by 3,—in August, by 4,—in September, by 3,—in October, by 4; in November, by 6; in December, by 6; scarlet fever, by 3,—in September, October, November, and December, by 1,—in February and November, by 1; at time not stated, by 1; influenza, by 3,—extensively in November and December, by 1,—in December, by 1,—at time not stated, by 1; cerebro-spinal meningitis, by 2,—in February, by 1,—in November, by 1; meningitis in March, pseudo-membraneous croup in October and November, erysipelas (phlegmonous) in April, septicæmia and apoplexy in May, ovarian dropsy in June, typhoid fever in February and March, yellow fever, whooping-cough with croup, neuralgia of heart, and congestive chill, at dates not given,—each by 1.

16. State number of cases of each of these diseases; namely, small-pox, cholera, scarlet fever, typhoid fever, measles, whooping-cough, cerebro-spinal meningitis, diphtheria, and any other epidemic, endemic, contagious, or infectious disease that appeared during 1878. (Facts are especially desired, but opinions are better than no statements, though it will be well to state them as opinions.)

17. Of the eight diseases mentioned in question 16, ***Name those of which no case appeared*** during the year 1878.

Of the 46 correspondents who replied to the circular, 7 made no statement in answer to question 16; all made some statement in answer to question 17. In reply to question 16, one correspondent reported 8 cases of typho-malarial fever; one, 40 cases; one, 20 cases of typhoid and typho-malarial fever; one, 4 cases of phlegmonous erysipelas; one, 6 cases of dysentery; one, several cases of erysipelas, a few of chicken-pox, and 3 of puerperal fever. The statements concerning the diseases named in these questions are summarized as follows:—

*The figures beginning paragraphs are the numbers of the questions in Circular 29, printed in smaller type on pages 150-176 of this Report. The replies, from which the summary is made, are *printed on pages 179-....*

Small-pox.—Concerning this disease, 1 correspondent did not reply; 43 stated that no case occurred in their localities; one reported 7 cases; one, 1 case. In reply to Circular 24, for 1877, there were reported from one locality (Detroit) 107 deaths from this disease.

Cholera.—Concerning this disease, 2 correspondents did not reply; 44 stated that no case occurred in their localities.

Scarlet fever.—Concerning this disease, 7 correspondents did not reply; 9 stated that no case occurred in their localities; 2 stated that there were a few cases; 3, that there were some cases; one, that there were several cases; one, that mild cases were reported; one, that it was very prevalent; 21 reported a total of 435 cases, or an average of 21 cases each, ranging from 1 case to 150 cases; one reported 103 deaths. In reply to Circular 24, for 1877, there were reported by 20 correspondents a total of 288 cases of scarlet fever, or an average of 14 cases each, ranging from 1 case to 60 cases; and from the same locality (Detroit) from which 103 deaths were reported for 1878, only 75 deaths were reported for 1877. It is worthy of note that 11 of the 21 localities from which the 435 cases were reported for 1878 are included in the 20 localities from which the 288 cases were reported for 1877; and that from these 11 localities there were reported 144 cases in 1878 against 92 cases in 1877. Of the other 10 localities from which the number of cases was reported (291 cases) for 1878, from one, "many cases" was reported in 1877, 30 cases in 1878; from one, "no case" was reported in 1877, 1 case in 1878; from one, no statement was made concerning this disease in 1877 (though indirectly the same observer reported 50 cases for that year), 30 cases were reported in 1878; from the other 7 no reply to the circular was received for 1877. Of 28 localities from which scarlet fever was reported in reply to the circular for 1878, it was reported from 16 in 1878; 2 made no statement in regard to the disease for 1878; and from 10 no reply to the circular was received for 1878.

Typhoid fever.—Concerning this disease, 8 correspondents made no reply; 14 stated that no case occurred in their localities; 2 stated that there were a few cases; one, that it was very prevalent; 20 reported a total of 162 cases, or an average of 8 cases, ranging from one case to 50 cases; one reported 27 deaths, against 47 deaths in 1877.

Measles.—Concerning this disease, 10 correspondents made no statement; 28 stated that no case occurred in their localities; one stated that there were mild cases; one, that there were a few light cases; 5 reported a total of 31 cases, or an average of 6 cases, ranging from 1 case to 20 cases; one reported 1 death.

Whooping-cough.—Concerning this disease, 10 correspondents made no statement; 14 stated that no case occurred in their localities; 3 stated that there were a few cases; one, that there were a few light cases; one, that there were mild cases; one, that it was very prevalent; one that there were many cases; one, that there were two cases; 13 reported a total of 617 cases, or an average of 47 cases, ranging from 5 cases to 300 cases; one reported 33 deaths.

Cerebro-spinal meningitis.—Concerning this disease, 4 correspondents made no statement; 33 stated that no case occurred in their localities; one stated that there were a few cases; 4 reported one case each; one reported 2 cases; one, 3 cases; one, 6 cases; one, one death.

Diphtheria.—Concerning this disease, 8 correspondents made no reply; 11 stated that no case occurred in their localities; 3 stated that there were a few cases; one, that there were some cases; 22 reported a total of 916 cases, or an

EXHIBIT 4.—*Stating by Months the Number of Correspondents who Reported Cases of certain Diseases in reply to Circulars 11, 15, 24, and 29, relative to diseases in Michigan in the Years 1875, 1876, 1877, and 1878*,—and also the Per Cent of Observers who made Weekly Reports of most of the same Diseases during the Year 1878.—(See Question 18 of Circular 29, on page 164, also following paragraphs.)*

Correspondents Reporting Cases, in reply to Circulars 11, 15, 24, and 29. — Diseases. January.	1875.*	1876.*	1877.*	1878.*	Per Ct. of Observers making Weekly Reports of, — 1878.
Bronchitis	2	5	13	20	84
Rheumatism	4	8	7	15	88
Intermit. Fever	1	1	3	15	86
Pneumonia	8	7	10	14	71
Influenza	..	..	8	13	66
Consumption	..	1	7	13	77
Diphtheria	2	5	9	11	51
Remittent Fever	2	..	7	9	73
Scarlet Fever	3	5	3	8	34
Typho-mal. Fev'r	1	..	2	6	34
Diarrhea	..	1	2	4	40
Whooping-cough	..	..	3	3	19
Puerperal Fever	..	..	1	3	12
Dyspepsia	..	..	..	3	....
Measles	1	2	1	2	5
Tonsilitis	..	1	..	2	10
Sore Throat	..	..	..	2	....
Erysipelas	1	2	3	1	47
Typhoid Fever	..	2	1	1	19
Typhoid Pneumo.	2	..	..	..	....
Pleurisy	2	..	..	1	....

Correspondents Reporting Cases, in reply to Circulars 11, 15, 24, and 29. — Diseases. February.	1875.*	1876.*	1877.*	1878.*	Per Ct. of Observers making Weekly Reports of, — 1878.
Bronchitis	2	6	12	22	82
Pneumonia	5	8	12	15	75
Intermit. Fever	1	3	5	15	83
Influenza	..	..	9	14	62
Rheumatism	4	7	7	14	82
Consumption	1	1	5	13	79
Remittent Fever	2	..	6	9	65
Scarlet Fever	3	6	3	9	51
Diphtheria	3	4	8	7	39
Diarrhea	..	1	2	4	45
Whooping-cough	..	2	2	3	18
Erysipelas	3	..	1	3	39
Typho-ma. Fev'r	1	..	1	3	24
Dyspepsia	..	..	..	3	....
Measles	2	2	2	2	7
Typhoid Fever	..	2	..	2	15
Dysentery	..	..	..	2	10
Cholera Morbus	..	..	..	2	[illegible]18
Neuralgia	..	..	..	2	7
Tonsilitis	..	..	..	2	6
Sore Throat	1	..	..	2	....
Croup	..	1	..	2	a14
Cerebro-Spi. Me.	..	..	2	1	7
Pharyngitis	..	1	2	1	....
Catarrhal Dis's	..	3	..	..	....
Peritonitis	2	..	..	..	....
Malarial Fever	2	..	..	..	....

Correspondents Reporting Cases, in reply to Circulars 11, 15, 24, and 29. — Diseases. March.	1875.*	1876.*	1877.*	1878.*	Per Ct. of Observers making Weekly Reports of, — 1878.
Bronchitis	..	7	12	19	84
Pneumonia	5	10	10	19	73
Intermit. Fever	1	3	8	19	85
Rheumatism	2	5	8	16	88
Consumption	1	..	7	16	81
Influenza	..	..	7	12	62
Remittent Fever	2	..	5	12	67
Scarlet Fever	3	6	5	10	52
Diphtheria	..	2	6	8	38
Diarrhea	..	1	1	5	49
Typho-ma. Fev'r	..	..	1	4	26
Whooping-cough	1	3	3	2	15
Typhoid Fever	..	1	1	2	11
Neuralgia	..	..	1	2	8
Tonsilitis	..	1	..	2	7
Croup	..	1	..	2	a14
Mumps	1	..	2	2	....
Pharyngitis	..	..	1	2	....
Meningitis	..	..	b1	2	....
Dyspepsia	..	..	..	2	....
Measles	3	..	3	1	5
Erysipelas	..	..	2	1	32
Puerperal Fever	..	..	2	..	8
Cerebro-Spi. Me.	..	2	1	..	5
Asthma	..	..	2	..	....
Dropsy	..	2	1	..	....
Rheumatic Fev'r	3	..	..	..	....

April.	1875.*	1876.*	1877.*	1878.*	Per Ct. of Observers making Weekly Reports of, — 1878.
Intermit. Fever	4	3	11	26	92
Bronchitis	2	5	10	21	79
Rheumatism	2	2	11	16	87
Pneumonia	4	7	8	14	73
Consumption	2	1	8	13	79
Influenza	..	..	4	10	63
Remittent Fever	1	1	3	10	62
Scarlet Fever	3	6	5	8	32
Erysipelas	..	1	4	6	30
Diphtheria	1	1	3	c5	38
Diarrhea	..	1	3	5	40
Typho-mal. Fever	..	..	..	4	29
Croup	..	1	..	3	a16
Pharyngitis	..	..	1	3	....
Puerperal Fever	..	1	2	2	2
Whooping-cough	..	2	..	2	17
Neuralgia	..	1	..	2	8
Tonsilitis	..	..	1	2	13
Measles	2	2	2	1	5
Dysentery	..	1	2	1	14
Typhoid Fever	..	1	2	..	10
Mumps	1	..	2	..	....
Catarrhal diseases	..	2	1	..	....

May.	1875.*	1876.*	1877.*	1878.*	Per Ct. of Observers making Weekly Reports of, — 1878.
Intermit. Fever	4	5	13	26	97
Bronchitis	..	2	8	15	78
Consumption	..	1	8	15	80
Rheumatism	..	2	10	11	80
Remittent Fever	1	2	9	10	65
Pneumonia	2	3	8	9	68
Influenza	..	..	5	8	62
Diarrhea	..	1	3	8	45
Erysipelas	1	1	3	5	37
Diphtheria	..	2	6	4	27
Scarlet Fever	2	2	5	4	33
Whooping-cough	1	4	2	2	27
Dysentery	..	1	..	2	23
Typhoid Fever	..	1	1	2	10
Typho-ma. Fev'r	..	..	1	2	23
Measles	1	1	3	1	8
Puerperal Fever	..	1	2	..	8
Cerebro-Spi. Me.	..	4	..	1	10
Asthma	..	2	..	1	....

June.	1875.*	1876.*	1877.*	1878.*	Per Ct. of Observers making Weekly Reports of, — 1878.
Intermit. Fever	4	6	14	24	93
Rheumatism	..	2	7	13	82
Consumption	..	1	6	12	70
Bronchitis	1	2	5	11	66
Influenza	..	..	4	10	48
Remittent Fever	1	4	12	9	70
Diarrhea	1	2	3	8	48
Pneumonia	..	2	6	8	56
Diphtheria	..	1	4	6	23
Scarlet Fever	1	2	4	6	28
Whooping-cough	1	5	3	5	25
Typho-ma. Fev'r	..	1	2	5	25
Dysentery	..	1	2	4	26
Erysipelas	1	..	2	3	26
Typhoid Fever	..	2	2	3	11
Cholera Morbus	..	..	5	2	30
Cholera Infant	..	2	2	1	18
Measles	1	2	2	1	7
Dropsy	..	1	2	..	....

* Eight correspondents replied to this question in the Circular for 1875; 46, for 1876; 18, for 1877; and 32, for 1878.

For comments on this Exhibit, see paragraph 18, and following paragraphs, pages 164–8.

a Membraneous Croup. b Cerebro-spinal Meningitis. c Includes one "Diphtheritic Croup."

average of 42 cases, ranging from 1 case to 200 cases; one reported 47 deaths. For 1877, in reply to the circular for that year, 15 correspondents reported a

EXHIBIT 4.—*Continued.*

Correspondents Reporting Cases, in reply to Circulars 11, 15, 24, and 29. — Diseases. July.	1875.*	1876.*	1877.*	1878.*	Per Ct. of Observers making Weekly Reports of, — 1878.
Intermit. Fever	4	6	13	25	93
Diarrhea	2	4	12	18	86
Remittent Fever	3	6	10	16	80
Consumption	..	1	6	13	71
Rheumatism	1	1	5	9	73
Bronchitis	..	..	6	9	63
Influenza	..	..	1	8	42
Whooping-cough	..	2	4	7	27
Cholera Morbus	..	..	8	6	63
Diphtheria	1	3	4	5	22
Pneumonia	..	3	2	5	39
Dysentery	..	4	4	4	51
Scarlet Fever	1	3	4	3	25
Erysipelas	2	2	2	3	27
Cholera Infantum	..	2	4	3	46
Eczema	..	..	..	2	----
Sun Stroke	..	..	..	2	----
Typho-ma. Fever	..	1	3	..	31
Measles	1	1	2	..	10
Typhoid Fever	1	2	1	1	10
Dropsy	..	1	2	..	----

Correspondents Reporting Cases, in reply to Circulars 11, 15, 24, and 29. — Diseases. August.	1875.*	1876.*	1877.*	1878.*	Per Ct. of Observers making Weekly Reports of, — 1878.
Intermit. Fever	4	8	14	27	94
Diarrhea	2	8	11	25	94
Remittent Fever	3	5	10	21	80
Dysentery	4	5	12	12	71
Bronchitis	..	4	5	12	56
Consumption	..	1	5	11	71
Cholera Infant	..	4	9	9	62
Cholera Morbus	..	2	9	7	59
Whooping-cough	..	4	4	7	30
Rheumatism	..	2	4	6	65
Diphtheria	..	2	3	6	23
Typhoid Fever	2	5	2	5	18
Pneumonia	1	3	1	5	26
Influenza	..	..	..	4	38
Typho-ma. Fev'r	3	2	3	3	39
Erysipelas	1	..	2	3	33
Tonsilitis	..	..	..	3	8
Scarlet Fever	1	2	4	2	27
Measles	2	..	..	2	8
Puerperal Fever	..	..	1	2	6
Bilious Fever	2	..	..	..	----
Dropsy	..	1	2	..	----

Correspondents Reporting Cases, in reply to Circulars 11, 15, 24, and 29. — Diseases. September.	1875.*	1876.*	1877.*	1878.*	Per Ct. of Observers making Weekly Reports of, — 1878.
Intermit. Fever	2	9	16	24	94
Diarrhea	2	9	14	22	98
Remittent Fever	2	5	10	20	84
Dysentery	6	5	12	17	73
Consumption	..	1	5	12	76
Bronchitis	..	1	3	11	65
Rheumatism	..	2	6	10	73
Typho-ma. Fev'r	4	4	5	10	60
Influenza	..	3	2	9	51
Whooping-cough	..	4	1	7	32
Diphtheria	1	1	3	7	27
Erysipelas	..	1	2	6	29
Cholera Infant	.	5	6	4	60
Cholera Morbus	..	1	5	4	56
Pneumonia	..	2	1	4	25
Scarlet Fever	1	..	4	3	35
Typhoid Fever	3	3	4	3	22
Measles	2	..	..	1	3
Croup	..	2	..	..	b5
Bilious Remit.	2	..	..	1	----
Bilious Fever	2	..	..	..	----
Malarial Fever	2	1	1	..	----
Dropsy	..	1	2	..	----

October.	1875.	1876.	1877.	1878.	Per Ct.
Intermit. Fever	2	9	15	24	97
Remittent Fever	4	5	13	19	84
Bronchitis	..	4	5	15	79
Consumption	..	3	6	14	79
Diarrhea	1	3	9	12	66
Influenza	..	2	6	12	59
Diphtheria	1	..	6	12	46
Typho-ma. Fever	5	2	6	11	70
Rheumatism	..	1	5	10	82
Dysentery	5	2	6	10	43
Whooping-cough	1	3	3	9	44
Typhoid Fever	4	2	3	6	31
Scarlet Fever	1	2	5	5	44
Erysipelas	1	2	1	5	43
Tonsilitis	..	..	..	4	39
Neuralgia	..	1	1	3	31
Pneumonia	1	3	2	2	49
Puerperal Fever	a1	1	..	2	5
Cholera Morbus	..	..	1	2	18
Cholera Infantum	1	1	3	1	26
Measles	..	3	..	1	3
Asthma	..	1	2	..	----
Dropsy	..	1	2	..	----
Pharyngitis	..	..	2	..	----
Croup	..	2	..	1	b16
Bilious Fever	..	2	..	..	----

November.	1875.	1876.	1877.	1878.	Per Ct.
Intermit. Fever	2	8	14	21	92
Bronchitis	1	3	9	19	79
Consumption	..	2	7	16	74
Diphtheria	..	2	9	15	75
Remittent Fever	3	3	12	14	49
Rheumatism	..	4	11	12	80
Whooping-cough	2	4	4	12	43
Influenza	..	2	4	11	62
Pneumonia	3	7	3	11	59
Typho-ma. Fev'r	2	1	7	8	39
Diarrhea	1	..	7	8	43
Neuralgia	1	..	1	7	41
Scarlet Fever	3	2	5	6	39
Tonsilitis	..	..	..	5	48
Typhoid Fever	..	2	4	4	15
Erysipelas	1	3	1	4	38
Dysentery	..	..	3	3	13
Measles	4	1	..	2	8
Croup	..	1	..	2	a28
Pharyngitis	..	..	1	2	----
Inflam. of Liver	..	..	..	2	----
Cerebro-Spl. Me.	3	1	..	1	5
Pleurisy	..	..	2	1	----

December.	1875.	1876.	1877.	1878.	Per Ct.
Bronchitis	2	9	9	22	85
Influenza	..	3	4	18	67
Diphtheria	3	6	9	17	54
Rheumatism	1	3	8	16	87
Pneumonia	1	7	7	16	77
Intermit. Fever	1	5	14	14	80
Consumption	..	2	6	13	77
Whooping-cough	2	5	4	11	41
Tonsilitis	..	1	..	8	59
Remittent Fever	..	2	10	7	54
Scarlet Fever	3	3	5	6	51
Neuralgia	1	1	..	6	46
Erysipelas	..	1	..	5	34
Typho-ma. Fev'r	1	..	5	4	28
Croup, Membra.	..	..	..	3	25
Croup	1	2	..	3	----
Typhoid Fever	..	3	2	2	16
Dysentery	..	1	2	2	11
Measles	2	..	..	2	10
Diarrhea	..	1	1	2	36
Pharyngitis	..	..	1	2	----
Abortion	..	..	2	..	----
Asthma	..	1	2	..	----

* Eight correspondents replied to this question in the Circular for 1875; 46, for 1876; 18, for 1877; and 32, for 1878.

a Puerperal peritonitis. b Membraneous croup.

total of 155 cases, or an average of 10 cases, ranging from 1 case to 40 cases. Of the 26 localities from which diphtheria was reported for 1878, 10 reported it in reply to the circular for 1877,—7 of them reported 223 cases in 1878 against 59 cases in 1877; 3 reported "no case" for 1877; from 14 no reply was received to the circular for 1877. Of 22 localities from which diphtheria was reported in reply to the circular for 1877, it was reported for 1878 from

10; from 2, no statement was received in regard to the disease, from 6 no reply to the circular was received for 1878; only 4 of them reported "no case" for 1878.

18.* For each of the months in 1878, please give a summary statement of the diseases which occurred, naming them in the order of their prevalence,—greatest first.

Of the 46 correspondents who replied to the circular, 14 made no statement in answer to this question. Of the 32 who replied to this question, one makes no statement for February, March, April, May, or November; one does not reply for March, April, August, or September; one does not reply for September; one answers only for the first four months of the year; one answers only for the last 9 months of the year. A tabular summary of the replies to this question is given in Exhibit 4, pages 162–3. This exhibit includes also summaries of the replies by 18 correspondents to the same question in Circular 24, relative to the diseases in 1877, by 46 correspondents to the same question in Circular 15, relative to the diseases in 1876, and by 8 correspondents to the same question in Circular 11, relative to the diseases in 1875. No disease, however, is included in the statement for any month, which was not reported for that month by more than one correspondent in one of these years. The last column of this exhibit for each month states for such of the diseases here reported as are printed on the postal blanks for weekly reports, the per cent of observers who reported them during that month of the year 1878. In studying this exhibit, it is necessary to bear in mind the number of correspondents who replied to the question for each year; these numbers are stated in a foot-note to the exhibit.

It will be noticed in this exhibit that many of the diseases were reported for 1877 and for 1878 by a much larger proportion of the correspondents who replied to this question than for 1875 or 1876. This may be in part explained by a slight change in the wording of the question for 1877 and 1878, though not in the meaning intended. Instead of "the diseases which occurred," the question for 1875 and 1876 read "the diseases which have prevailed," an expression which seems to have been understood by some to mean diseases which were *unusually* prevalent, or more prevalent than other diseases. The exhibit may be studied in connection with the tables and diagrams formed from weekly reports of diseases, which are printed on subsequent pages of this volume.

DIPHTHERIA AND SCARLET FEVER.

The replies to questions 6, 8, 10, 12, 14, 15, 16, 17, and 18 of this circular and of Circular 24, relative to diseases in Michigan in 1877, seem to indicate that for the years 1877 and 1878 there was in the State a very large amount of sickness from diphtheria and scarlet fever. This is also indicated by special reports received at this office from time to time, and by the weekly reports, which have been received regularly since the first of September, 1876. In a few localities these diseases seem to have been slightly less prevalent in 1878 than in 1877, but in many localities one or both of them either began in 1878 or was much more prevalent in 1878 than previously. On the whole the evidence of these replies is, perhaps, that they were more prevalent in 1878 than

*The figures beginning paragraphs are the numbers of the questions in Circular 29, printed in smaller type on pages 150–176 of this Report. The replies, from which the summary is made, are printed on pages 179–....

in 1877. The evidence of the weekly reports is that both were more prevalent in 1878 than in 1877. For every month except January and February the per cent of weekly reports stating prevalence of diphtheria was greater in 1878 than in 1877; and for every month except January, April, and May, the per cent of weekly reports stating prevalence of scarlet fever was greater in 1878 than in 1877. This is more clearly presented in Exhibit 5, below, which also states by months the differences between these per cents for the two years 1877 and 1878.

EXHIBIT 5.—DIPHTHERIA AND SCARLET FEVER *in Michigan by Months in 1877 and 1878,—Per Cent of Observers and of Weekly Reports Stating Prevalence of These Diseases in Each of the Years Named; Also Differences between These Per Cents for the Two Years.*

MONTHS.	DIPHTHERIA.						SCARLET FEVER.					
	PER CENT OF OBSERVERS REPORTING PREVALENCE OF.*			PER CENT OF WEEKLY REPORTS STATING PRESENCE OF.*			PER CENT OF OBSERVERS REPORTING PREVALENCE OF.*			PER CENT OF WEEKLY REPORTS STATING PREVALENCE OF.*		
	1877.	1878.	In 1878 Greater (+), or Less (—), than in 1877.	1877.	1878.	In 1878 Greater (+), or Less (—), than in 1877.	1877.	1878.	In 1878 Greater (+), or Less (—), than in 1877.	1877.	1878.	In 1878 Greater (+), or Less (—), than in 1877.
YEAR	32	37	+5	19	23	+4	33	38	+5	21	25	+4
January	51	51	0	33	30	—3	43	34	—9	28	23	—5
February	38	39	+1	24	24	0	38	51	+13	26	29	+3
March	35	38	+3	19	23	+4	34	52	+18	22	35	+13
April	31	38	+7	16	22	+6	38	32	—6	24	24	0
May	15	27	+12	8	14	+6	33	33	0	21	21	0
June	18	23	+5	10	12	+2	37	28	—9	18	20	+2
July	18	22	+4	10	12	+2	29	25	—4	16	17	+1
August	14	23	+9	7	16	+9	23	27	+4	17	20	+3
September	22	27	+5	12	19	+7	22	35	+13	15	25	+10
October	44	46	+2	25	27	+2	34	44	+10	19	28	+9
November	46	49	+3	29	35	+6	37	39	+2	22	26	+4
December	41	54	+13	26	40	+14	26	51	+25	18	32	+14

* Explanations of statements in these columns, and other statements relative to the prevalence of the diseases under consideration may be found in Tables 2 and 3 in articles on Weekly Reports of Diseases in Michigan, for 1877 on pages 262-290 of the Sixth Annual Report of the State Board of Health, and in tables for 1878 on subsequent pages of this volume.

The evidence of the replies to these circulars is also that there was a large mortality from diphtheria and from scarlet fever in 1877 and 1878; how great a mortality cannot yet well be determined. Special reports of a large number of cases of diphtheria, and of deaths from the disease in epidemics occurring in ten rural localities in Michigan in 1877 and 1878 (not, however, the totals for those years), are published on pages 381–390 of the Fifth, on pages 78–85 of the Sixth, and on pages 105–114 and 125–127 of this Seventh Annual Report of the State Board of Health. From these

ten localities there were reported 332 cases of diphtheria, and 64 deaths from diphtheria. It is believed that there have been many other localities where the sickness and mortality from diphtheria were not less than in these. In the Detroit cemeteries there were buried of those who had died from diphtheria, 47 in 1878, 54 in 1877, and 30 in 1876; the number of cases is not known.

As regards the mortality from diphtheria this evidence is greatly strengthened by the Vital Statistics of Michigan compiled from returns of deaths to the State Department for the years 1869–1877, according to which the deaths from diphtheria in 1877 were over one-fourth the total deaths from that disease for the nine years, 1869–1877. According to these returns, scarlet fever seems to have reached its maximum in 1870. That it has not increased equally with diphtheria may in part be explained by the fact that there has been a better recognition of its contagiousness, and that, therefore, more vigorous measures have been taken for its restriction. The number of deaths returned for these years is stated in Exhibit 6.

EXHIBIT 6.—DEATHS *from Croup, Diphtheria, and Scarlet Fever, returned to the State Department for Each of the Years 1869–1877,—also, Total and Average for the Same Years.*

DISEASES.	Total.	Average.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
Croup	1,370	152.2	105	127	153	162	172	142	167	178	164
Diphtheria	2,064	229.3	89	121	121	192	217	213	207	311	593
Scarlet Fever*	4,610	512.2	252	852	696	565	580	440	423	399	404

*Includes "scarlet rash" and "canker rash."

Both scarlet fever and diphtheria are contagious diseases; they are propagated largely, if not wholly, by direct or indirect exposure to persons having the disease. It has been demonstrated again and again that these diseases may be restricted and altogether stamped out, when by chance they have gained only a slight footing in a place, nearly as effectually as may small-pox, though in these diseases we have not that powerful aid—vaccination—which is so effectual in small-pox. There can be no doubt that if local boards of health would promptly and thoroughly isolate the first cases of these diseases which occur within their jurisdiction, and thoroughly disinfect or destroy all infected articles, many lives might be saved every year, not to mention much expense and loss of time now incurred on account of sickness. The law has wisely declared it to be the duty of physicians and householders to report to the local board of health cases of diseases dangerous to the public health. Many people are not aware of the contagious nature of diphtheria and scarlet fever, and it is nothing less than criminal on the part of physicians or others to teach that they are not contagious diseases, or diseases dangerous to the public health within the meaning of the law. Not until the people are thoroughly awake to the importance of immediate and efficient isolation of those sick with diphtheria or scarlet fever, and of the destruction of infected articles, can any family in the State be safe from the invasion of these terrible diseases; because every family is so closely associated with persons, clothing, food, books, etc., coming from all the different ranks in society or stations in life, that even if all the members of a household have perfect knowledge of the nature, causes, and best modes of preventing such a contagious disease as scarlet fever or

diphtheria, it is sometimes impossible to avoid contracting the disease, on account of the action of other persons, who are ignorant of the contagious nature of the disease and of the methods by which it is spread. As the strength of a chain is the strength of its weakest link, so also it is true that the safety of the best informed on sanitary subjects often depends upon the action of those least informed. The formation of an intelligent public opinion on this subject is therefore of great importance to the welfare of all classes of people; and it is earnestly hoped that every reader of this Report will endeavor to coöperate with the State Board of Health in spreading a knowledge of the communicability of such diseases as scarlet fever and diphtheria.

DIPHTHERIA AND INFLUENZA.

Some facts relative to the coincident prevalence of diphtheria and influenza seem worthy of mention in this connection. It will be noticed by Exhibit 4, pages 162–3, that for December 1878 diphtheria was reported by a somewhat larger proportion of the correspondents who replied to the question than for December 1877; and by Exhibit 5, page 165, that a much larger per cent of the weekly reports stated presence of diphtheria in December 1878, than in December 1877. This difference is made more noticeable by Diagram 2 relating to weekly reports of diseases in 1878, on a subsequent page of this Report, in connection with the corresponding diagram for 1877 on page 295 of the Annual Report of this Board for 1878. It will also be noticed by Exhibit 4, pages 162–3, that the replies to question 18 indicate a much greater prevalence of influenza in December 1878, than in December 1877. In reply to question 15, as to diseases prevalent in 1878 but not usually prevalent, one correspondent reported influenza as prevalent in December, one reported it as "extensively" prevalent in November and December, and one as prevalent at time not stated. The per cent of weekly reports stating prevalence of influenza was less in 1878 than in 1877, from January to March, and greater from April to December, inclusive. This is more definitely shown by the diagrams already referred to.

This apparent coïncident prevalence of the two diseases may be explained in several ways. It may be that much influenza is reported as diphtheria, or that much mild diphtheria is reported as influenza. It may be that when diphtheria is prevalent, that which causes it in some persons causes in others only influenza. It is certain that influenza, by its irritation of the throat and air-passages, renders all persons much more susceptible to the poison of diphtheria. Thus the real influenza may be due to meteorological conditions, and be the occasion of an unusual spread of diphtheria. Some study of the meteorological conditions may be made, in connection with this subject, in the article on the principal meteorological conditions in Michigan in 1878, on subsequent pages of this Report.

INTERMITTENT FEVER.

It will be noticed in Exhibit 4, pages 162–3, that for 8 successive months in 1878, beginning with April, intermittent fever was reported by a greater number of correspondents than reported any other disease for the same months, and that for the other 4 months of the year it was reported by a large number of correspondents, in no month by less than 14 of the 32 correspondents who replied to this question. In 1877, for 8 successive months beginning with May, intermittent fever was reported by more correspondents than was any

other disease, and for April only one disease, rheumatism, was reported by as many correspondents. For the first 3 months of 1877 intermittent fever does not seem to have been so generally prevalent as for the corresponding months of 1878. It is a generally recognized fact that drainage and other improvements of the soil have greatly reduced the sickness from this disease in Michigan. That by these means it can still be greatly reduced is firmly believed; that there is large room for a wise expenditure of money in the construction of drains and ditches in the interest of health alone, there can be no doubt. In view of the sickness from this disease alone it would seem that the legislature might years ago wisely have ordered a sanitary survey of the State, and that it is yearly becoming more important that such a survey be made, in order that work already being done may be made most efficient for the interests of the public health.

The suggestion by Dr. J. S. Caulkins, of Thornville (found in his reply to the last question of the circular, on subsequent pages of this volume), to leave in clearing, or to plant if the land is already cleared, a belt of trees near the dwelling-house and on that side from which the prevailing winds blow, is an important suggestion, and one strengthened by the fact that similar suggestions were independently made by two other correspondents, Dr. D. W. C. Burch, of Rockford, and Dr. S. C. Van Antwerp, of Vicksburg, Mich. It has many times been suggested that a belt of trees between the source of the malaria and the residence will give comparative safety from the effects of malaria from such source.

Aside from considerations of health, the cost of planting such a belt of trees would, in many cases, be repaid by the improvement in the looks and convenience of a place; while in connection with the objection mentioned by Dr. Caulkins, that such a belt might in hot weather be unpleasant by shutting off the cool breeze, it should be remembered that trees pour a large amount of moisture into the air, especially on a hot day; and on such a day the air that passes over or through a belt of trees is cooled by the evaporation of the water from the trees and the elevation of its temperature, just as it is cooled by passing over a lake. An atmosphere *saturated* with moisture is, however, very "oppressive," from the fact that in it but little evaporation takes place from the surface of the body, and the body is not, therefore, cooled as it is by evaporation when the air is dry.

However greatly a locality may be dependent on public improvements for a complete removal of conditions deleterious to health, much may be done by private effort, both in the selection of healthy sites for dwellings, in the improvement of those sites, and by various means, in the mitigation of unfavorable conditions immediately surrounding the dwellings. There is no such appreciation of public improvements as is felt where private enterprise has done its best towards the desired result; and where the success of individual effort has demonstrated the feasibility of the proposed plan of improvement, there is created the strongest demand for the public improvement.

19.* During the year 1878, have any cases of yellow fever occurred in your locality? If so, from whence did the persons come? How long after they had left an infected locality before they came down with the disease?

In reply to this question, 42 correspondents stated that no case of yellow

* The figures beginning paragraphs are the numbers of the questions in Circular 29, printed in smaller type on pages 150-176 of this Report. The replies, from which the summary is made, are printed on pages 179-....

fever occurred in their localities; one reported one case that came from the South; 3 made no statement.

20. Please communicate the details of cases of yellow fever, if any cases have occurred in your locality, and fully as regards evidence of the appearance or non-appearance of any unusual cases of fever in any way simulating that disease. (It is important to establish the fact of there having been no such cases, if such is the fact.)

In reply to this question, 26 correspondents made no statement, 23 of them having stated in answer to question 19 that no cases of yellow fever occurred in their localities; 16 stated that no unusual cases of fever in any way simulating yellow fever occurred in their localities.

Dr. Chase, of Elsie, said, "It was noticed in about two-thirds of the cases of typho-malarial fever and remittent fever that they commenced usually with fetid diarrhea, occasionally very dark and inky vomit."

Dr. Belknap, of Niles, said, "Our cases of bilious or typho-malarial fevers assumed a different type from anything I have previously seen, viz., irritable stomach with some vomiting of a yellow or dark yellow fluid, skin yellow or dingy, kidneys and bowels both disturbed, the former sluggish and the latter irritable, with small, dark-colored evacuations, convalescence slow with a liability to a relapse or recurrence of the same class of symptoms, but no unusual mortality."

Dr. Reeves, of Niles, said, "The fevers were all of a mild character, and terminated favorably; but in all the cases I met with there was an extremely irritable condition of the stomach. In three cases there was acute gastritis. In a number of cases the stomach gave but little trouble until the fever was about to subside, or had subsided, when it ceased to be retentive, and rejected almost everything that was swallowed. Small portions of ice would sometimes be retained. Grumous blood appeared in the matter ejected from the stomach in three cases. During the entire period of convalescence gastralgia resulted from the least imprudence in diet, in nearly all the cases I met with."

Dr. Yates, of Washington, Macomb county, said, "I have had no cases resembling it; the nearest were a few cases of obstinate jaundice in the month of December."

21. During the prevalence of yellow fever at the South, did you notice in your locality any unusual cases of fever differing from cases which have occurred in your vicinity at other times when yellow fever was not prevalent in the United States?

22. In any such unusual case at that time, was there black vomit or vomiting of blood?

23. In any such unusual case at that time, was there evidence of contagiousness or infectiousness?

In reply to these questions, 36 correspondents said that they did not notice any unusual cases of fever differing from cases which have occurred when yellow fever was not prevalent in the United States; 5 made no statement; Dr. Chase, of Elsie, said that he noticed such cases, that there was a very dark vomit, and sometimes blood, but no evidence of contagion or infection; Dr. Goodwin, of Cassopolis, said that cases of intermittent fever were more

severe, but there was no black or bloody vomit, and that he observed no evidence of contagiousness or infectiousness; Dr. Belknap, of Niles, said that there was nothing except what is stated in reply to question 20 above; that the trouble there described was either epidemic or contagious, he thinks it was contagious, and that there was no black or bloody vomit.

The reply by Dr. Reeves, of Niles, to questions 21 and 22 is included in his reply to question 20, quoted on page 169. He stated that the trouble there described was not contagious or infectious.

Dr. Palmer, of Brooklyn, said that in their epidemic of diphtheria there was black vomit and vomiting of blood.

Dr. Clapp, of Mendon, said that there was no such unusual case of fever, excepting what was diagnosed as jaundice, one case of which died, and in which there was no black vomit or evidence of contagion.

Dr. Christian, of Wyandotte, said that the ordinary endemic fevers were of a severer type and more general, and that there were more of a typho-malarial and typho-enteric type.

24.* During the mild months of January, February, and March, 1878, was dyspepsia unusually prevalent in your locality?

In reply to this question, 38 correspondents stated that dyspepsia was not unusually prevalent during these months, or that they did not observe it to be; 3 stated that it was unusually prevalent during these months; one stated that stomach trouble was a common complaint, but nothing severe; one, that it was not so unusually prevalent as to attract attention; one, that he did not remember; two made no statement.

25. During the year 1878, *what diseases* occurred, *at what time* and *to what extent, among animals?*

In reply to this question, 11 correspondents stated that no disease occurred among animals in their localities; one, that there was nothing epidemic; 5, that there was nothing noticeable, special, or unusual; one, that animals were quite healthy; one, that there was but little, and that due to carelessness; 6 made no statement. By the other 20 correspondents the following diseases among animals were reported:—

Hog cholera, by 7,—during greater part of the year, by 1,—in Fall, by 1,—in Autumn and Winter months, by 1,—in Summer, by 1, who also reported pleuro-pneumonia in the Fall and Spring, both diseases to a limited extent,—in July and August, by 1; at time not stated, by 2; one correspondent stated that there was less than the year before; horse distemper, by 3,—in November and December, by 1,—in December, by 1,—in Spring and Fall, by 1, who said that in several instances during the Fall it terminated in inflammation of the lungs and proved fatal; epizoöty among horses, by 3,—in the Fall, by 1,—in Spring and Fall, by 1,—slightly the last of the year, by 1. One correspondent reported a few cases of epizoöty in Spring and Fall, but did not state among what animals; two correspondents reported deaths from eating smutty corn or cornstalks, one of them saying among cattle, the other not stating among what animals. Three reported cholera among hens,—one, in July and August,—one, in May and June,—one, in Autumn and Winter months; one reported a good deal of mortality among chickens in the Spring; one reported

*The figures beginning paragraphs are the numbers of the questions in Circular 29, printed in smaller type on pages 150-176 of this Report. The replies, from which the summary is made, are printed on pages 179-....

roup among poultry in the Fall. One reported influenza among horses in December; one reported some disease among distillery-fed cattle.

26. During the year 1878, what diseases, as rot, rust, smut, bunt, mildew, or mould, occurred among the crops, as potatoes, hops, fruits, and especially cereals and grasses?

In reply to this question, 6 correspondents made no statement; 15 stated that no disease occurred among crops; 2, that there was no complaint; one, that there was nothing in particular; one, that there was none of any account; one, that he knew of none; one, that he heard of none; one, that there was very little; one, that garden crops were excellent; 4 reported rust in wheat; 4, smut in wheat; 4, smut in corn; 2, rot in potatoes; one stated that potatoes were blighted and diseased; one, that apples rotted unusually; one, mildew in grass; the cabbage insect, the wheat fly, and the Colorado potato beetle were each reported by one correspondent; one correspondent reported "rot, rust, and smut," but did not state among what crops.

27. As regards rye, oats, corn, buckwheat, and other grains raised in 1878, wheat in particular, what was the actual condition when ready for market or use?

In answer to this question, 28 correspondents stated that the grains raised in 1878 were, when ready for market or use, in "fair," "good," "excellent," or "unusually good" condition; one, that they were as usual in most years; 5 made no statement; 3 stated that they were good, except that some wheat was grown; one, that they were good except that wheat was damp; one, that wheat was not as dry as in some seasons; one, that they were all good except Clawson wheat, which had to lie some time to harden; one, that the wheat crop was good, but did not make the best flour; one, that wheat was injured by a wet harvest; one, that most grains were in good condition; one, that they were of inferior condition generally, from ripening too fast; one, that nothing was prime, wheat decidedly poor, other crops passable, except hay, which was poorer than is often known.

28. Were any of these grains, mentioned in question 27, affected by any kind of fungus?

In answer to this question, 31 correspondents stated that none of these grains were affected with any kind of fungus; 8 made no statement; one stated that there was smut in wheat to a slight extent; one, that wheat and corn were slightly affected with smut; one, that wheat, corn, and oats, and one, that corn and oats were affected with some kind of fungus.

29. Was the wheat raised in 1878 generally allowed to get thoroughly dry before it was threshed?

In answer to this question, 33 correspondents stated that the wheat raised in 1878 was generally allowed to get thoroughly dry before it was threshed, one of them excepting Clawson wheat; 5 made no statement; 2 stated that much was not dry; one, that wheat threshed immediately after the harvest was not quite dry; one, that it would not dry out well; one, that it was generally damp and threshed early; one said that it was not generally dry; one, that it was not as dry as in some seasons; one, that it was about the same as reported in former years.

30.* Did a ***greater,*** a ***less,*** or the ***usual proportion*** of wheat raised in 1878 "bank" in the bin?

In answer to this question, 10 correspondents stated that the proportion of wheat raised in 1878 which banked in the bin was less than usual; 8, that it was the usual proportion; 2, that it was greater than usual; 14 either made no statement or said that they did not know; 5 said "no," an answer hard to understand; one stated that it did not bank; one, that none that was properly taken care of banked; 2, that there was no complaint; one, that very little if any banked; one, that not much banked with farmers, some in warehouses; one, that millers and elevators were careful not to store grain before it had sweat.

31. Was the hay crop, secured in 1878, ***more*** or ***less than usually*** affected by mildew or mould?

In answer to this question, 17 correspondents answered "less;" 6, "usually;" 3, "more;" 7 stated that it was good, or secured in good condition; one, that early-cut hay was injured; 6 answered "no," one "none," and one "It was not,"—answers not easily understood; 4 made no statement.

32. Please give a summary statement of the meteorological conditions during the year 1878, specifying, if possible, the general characters for each month, and noting any peculiar or unusual conditions.

In reply to this question, one correspondent stated that the whole year was dry and mild; 2, that there were no peculiar or unusual conditions; one, that the entire season was unusually wet; one, that it was generally dry; one, that there was an unusually hot and wet Summer, followed by an unusually mild Winter; one stated that during the Spring there was more than the usual rainfall; during the Summer and Autumn, the average; and that the Winter was unusually steady and mild with good fall of snow, snow falling for 43 consecutive days; one stated that January, February, and March were unusually warm and rainy, and November and December unusual in their steady cold and amount of snowing days and cloudy skies; one stated that it was warm in January and February; wet in March and April; dry in May and June; wet in July and August; dry in September, October, and November; wet in December. Meteorological tables were received from Drs. Hazlewood, of Grand Rapids, Nicholson, of Otisville, Caulkins, of Thornville, Palmer, of Brooklyn, Rouse, of Detroit, and Yates, of Washington, Macomb county, and are printed with their replies.

33. Please state the facts concerning the ***soil moisture*** in your locality, during each of the months in the year 1878, ***without reference to previous years,*** but comparing the months in 1878 with each other. Group them in order—driest first.

34. ***Compared with previous years,*** in what months of the year 1878 was the ***soil*** in your locality ***unusually dry?***

35. ***Compared with previous years,*** in what months of the year 1878 was the ***soil*** in your locality ***unusually moist?***

An abstract from the replies to these questions and a summary are given in Exhibit 7, page 173.

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*The figures beginning paragraphs are the numbers of the questions in Circular 29, printed in smaller type on pages 150-176 of this Report. The replies, from which the summary is made, are *printed on pages 179-....*

EXHIBIT 7.—*Soil Moisture in Michigan by Months during the Year 1878, as indicated by the Replies of 26 Correspondents to Questions 33, 34, and 35 of Circular 29 from the State Board of Health.*

Divisions* and Localities.	Soil Moisture by Months and without Reference to Previous Years. Months in Order of Dryness, Driest First—(Question 33 page 172.)	Soil Unusually Dry. Time.—(Question 34, page 172.)	Soil Unusually Moist. Time.—(Question 35, page 172.)
All Localities.	†	‡	§
UPPER-PENINSULAR.*			
Houghton	Whole year dry.		
WESTERN.*			
Drenthe	.....	July, Aug., and Sept.	April.
Rockford	Jan. and Feb., rather dry; March, June, Sept., Oct., and Nov., medium; April, May, July, Aug., and Dec., unusually wet.	July 20 to Oct.	March, April, May, and July to the 20th.
CENTRAL.*			
DeWitt	Aug., Sept., July, and June. Very wet and muddy until about April 15.	Aug. and first half of Sept.	Jan., Feb., and Mar.
Elsie	(1.) July, Aug., Sept.; (2.) May, June; (3.) Jan., Feb., March; (4.) April, Oct., Nov., and Dec.	July, Aug., and Sept.	Oct. and Nov.
Howell	.....	June, July, and Aug.	Jan., Feb., and Mar.
Ithaca	Aug., Sept., Oct., July, Nov., Dec., May, June, Apr., Jan., Feb., Mar.	At no time	Jan., Feb., and Mar.
Otisville	No record	Observed no unusual dryness.	June and July.
St. Johns	In Jan. and Feb., sloppy weather and deep mud; greatest rainfall in April, rained nearly half the time; light showers in June and July, earth dry; drought somewhat injurious in Aug.	.....	April.
Webberville	June, Aug., Sept., the driest; Feb., May, July, next; Jan., Dec., next; Mar., Apr., Oct., Nov., next.	At no time	At no time.
BAY AND EASTERN.*			
Bay City	Usual Spring and Autumn rains	Quite uniform, an av. of other years.	Quite uniform, an av. of other years.
Lapeer	Unusually wet entire season	At no time	Entire season.
Port Sanilac	Aug., July, Sept., Oct., June, Dec., Nov., Jan., Feb., Mar., May, Apr.	July and Aug.	March, April and May.
Saginaw	No record	At no time	At no time.
Thornville	Jan., Aug., May, April, Oct., June, Nov., and Dec.; Feb., Sept., July, and March.	At no time	Nearly all the time, as compared with the last 5 or 6 y'rs.
SOUTH-WESTERN.*			
Cassopolis	Cannot say	Aug. and Sept.	May to July.
Dayton	No data	Aug. and Oct.	May and Nov.
Mattawan	.....	Aug., Sept., and Oct.	At no time.
Niles[1]	July and Aug.	July	April.
SOUTHERN-CENTRAL.*			
Brooklyn	June, July, Aug., and Sept.	June, July, Aug., and Sept.	
Hillsdale	Winter quite dry; May, June, and first part of July, very wet; ⅝ of July, all of Aug., Sept., first half of Oct., very dry; little rain or snow during winter.	The Summer	May and June.
Hudson	Most moist during Spring and Fall months.	About an average.	
Mendon	Oct., Sept., Aug., Jan., March, May, June, Dec., Nov., Feb., April, July.	Oct., Sept., Aug., and Jan.	July, April, and Feb.
Three Rivers	May, June, Aug., Sept., Oct., Jan., March, April, July, Feb., Nov., and Dec.	Aug. and Sept.	July and April.
Vicksburg	Dry	Sept. and Oct.	April.
SOUTH-EASTERN.*			
Wyandotte	No record	In no month	In Spring and Summer months.

* For counties in each division, see Exhibit 1, page 153.

† These statements cannot well be summarized. Most of them name the months in the order of dryness of soil, driest first. Eighteen correspondents made statements in reply to the question (33.)

‡ Soil reported **unusually dry** at some time of the year 1878 by 15 correspondents, as follows:—In Jan., by 1; in June, by 2; in July, by 7; in Aug., by 12; in Sept., by 10; in Oct., by 5; in Summer by 1; also reported unusually dry *at no time*, by 8; one reported that it was about an average.

§ Soil reported **unusually moist** at some time of the year 1878 by 19 correspondents, as follows: In Jan., by 3; in Feb., by 4; in March, by 5; in April, by 8; in May, by 5; in June, by 3; in July, by 5; in Oct., by 1; in Nov., by 2; in Spring and Summer months, by 1; nearly all the time, by 1; the entire season, by 1; also reported unusually moist *at no time*, by 4.

[1] Simeon Belknap, M. D.

EXHIBIT 8.—*Depth of Water in Wells, Depth of Earth above Ground Water, and Relative Height of Ground Water, in Michigan, by Months, during the Year 1877,—as indicated by the Replies of 34 Correspondents to Questions 36, 37, 38, and 39 of Circular 29 from the State Board of Health.*

Divisions* and Localities.	Average Depth of Water in Wells, by Months.—(Question 36, page 176.)	Usual Depth of Earth Above Ground Water.—(Question 37, page 176.)	Depth of Earth Above Ground Water, by Months.—(Question 38, page 176.)	Ground Water Unusually High.—Time.—(Question 39, page 176.)	Ground Water Unusually Low. Time.—(Question 40, page 176.)
All Localities.	†	‡	§	‖	¶
UPPER-PENINSULAR.*					
Houghton	Many wells totally dry during the whole Summer.	Varies from bare rock to 60 ft. and over.			
WESTERN.*					
Drenthe		10 to 100 ft.			
Rockford	3 feet	12 to 25 ft.	12 ft. Does not vary	It does not fluctuate.	It does not fluctuate.
CENTRAL.*					
De Witt	2 or 3 feet; in most wells but little affected by wet or dry weather.	13 to 45 ft. in village; 8 to 60 ft. in township.	In wet months, surface saturated; in dry months, from 8 to 60 ft., according to elevation.	Jan., Feb., and March	Aug. and Sept.
Elsie	About 3 ft.	From 10 to 20 feet.	Jan. and Feb., 8 ft.; Mar., 7 ft; Apr. and May, 7¼ ft.; June, 8 ft; July, 8¼ ft.; Aug., 10 ft.; Sept., 11 ft.; Oct., 11¼ ft.; Nov., 10 ft.; Dec., 9 ft.	Compared favorably with other years, especially during the Winter months, high: and during the Summer and Fall, low.	
Howell	Not known	15 to 40 ft.	Not known	Jan., Feb., and March	June, July, and Aug.
Ithaca	Depends on the soil moisture; wells 10 to 40 ft. deep; when very wet they are full; when dry, they are very low.	12 ft. and more	Cannot say	Jan., Feb., and March	At no time.
St. Johns	Varies but little	10 to 30 ft.			
Webberville	About 4 ft.	From 14 to 20 ft.	Cannot say	March, Apr., and May	None.
BAY AND EASTERN.*					
Bay City	5 ft.	10 or 15 ft.	Does not vary much.		
Lapeer	Usually about 3 ft.	25 or 26 ft.	Cannot say	Cannot say.	Cannot say.
Port Sanilac				April and May	October.
Saginaw	2 to 5 or 8 ft.	2 to 5 or 8 ft.	Cannot say	At no time	At no time.
Thornville	No measurements	20 to 100 ft.	No measurements	Little variation	Little variation.
SOUTH-WESTERN.*					
Cassopolis				June and July	Aug. to Oct.
Dayton	From 10 ft. in March, Apr., May, and Nov., to 1 or 2 ft. or none in Aug.	20 ft.			
Mattawan	3 ft.	25 ft.		At no time	At no time.
Niles [1]	3 to 6 ft.	4 ft. to 60 ft.	Cannot say	April	At no time.
Niles [2]	About 6 ft.	West Niles, 40 ft.; East Niles, 3 to 18 ft.	In West Niles, 43 ft. in June, July, and Aug.; 40 ft. the rest of the year.		
Otsego		6 to 100 ft. [see reply.]		Feb., Mar., and Apr.	Nov. and Dec.
St. Joseph		6 to 18 inches.			

SOUTHERN-CENTRAL.*					
Brooklyn	Not much variation except during the four months, June to Sept.; 6 ft. until Sept., when many wells were dry.	16 to 75 ft.	No data	No data	Sept., Oct., and Nov.
Hillsdale	Seldom varies much	20 to 80 ft. [see reply.]	No ground water in the city, except on the flats; in the timber land a few feet.	May and June	Sept., Oct., Nov., and Dec.
Hudson	2 to 6 ft.	In some 10 feet; in others, 20 to 25 ft.	Cannot say	March and April	At no time.
Kalamazoo		In the valleys, 10 to 20 ft.; prairies and table-lands, 50 to 100.	Cannot say	Cannot say	Cannot say.
Menden	No data	Between 15 and 17 ft.	No data	Feb., April, and July.	Jan., Sept., and Oct.
Sturgis		40 ft.	No material change from month to month, or year to year.		
Three Rivers	4 to 6 ft. Does not vary much.	Cannot say	Cannot say	July and Spring mo's	Fall months and Dec.
Union City		40 ft. in the village; 20 to 24 ft. in the oak openings; 10 to 20 ft. in the heavy timbered portion.			
Vicksburg	14 to 16 inches	14 to 15 ft.			
Ypsilanti		East of the Huron river, 40 to 60 ft.; west 15 to 25 ft.	Very low in Nov.	June.	
SOUTH-EASTERN.*					
Detroit [3]	No wells.				
Northville	About 2½ ft.; does not vary much.	30 to 50 ft.	Not much variation.		
Pontiac	3 to 5 ft.; little variation	Variable; wells 20 to 90 feet deep.	Cannot say	Cannot say	Cannot say.
Trenton	April and May, full; June, ¾ to ½ full; July, ½ to ¼ full; August, ¼ to ½ full; September, ¼ full; October, ½ full; November and December, ¾ full; January, February, and March, ½ full.	Wells from 15 to 25 ft. deep; land averages 15 ft. above water line of river.	See 36 and 37	Cannot say	Cannot say.
Washington	About 4 ft.	8 to 10 ft. east and south-east; 25 to 30 ft. north and north-west.	Cannot say	March	Aug.
Wyandotte	Fewer wells than usual became dry.	From 12 in. to 12 ft.	No record	In the Spring and in Nov.	Not at any time.

* For counties in each division, see Exhibit 1, page 153.

† In reply to this question (36), 24 of the 46 correspondents who replied to the Circular, made statements (not all of them, however, by months), concerning the average depth of water in wells in 1878. An abstract from the statements is given in the second column of the exhibit. They cannot well be compiled.

‡ In answer to this question (37), 33 correspondents made statements concerning the usual average depth of earth above ground water in 1878.

§ In reply to this question (38), 10 correspondents made statements concerning the depth of earth above ground water, by months, in 1878, three of them stating that it did not vary much.

‖ Ground water reported **unusually high** at some time of the year 1878 by 16 correspondents, as follows: In January, by 3; in February, by 5; in March, by 7; in April, by 6; in May, June, and July, by 3; in Nov., by 1; in Spring, by 1; also reported unusually high *at no time*, by 3; one reported that there was but little variation.

¶ Ground water reported **unusually low** at some time of the year 1878, by 10 correspondents, as follows: In Jan., June, and July, by 1; in Aug., by 4; in Sept., by 4; in Oct., by 5; in Nov. and Dec., by 3; in Fall months, by 1; also reported unusually low *at no time*, by 7; one reported that there was but little variation. [1] Simeon Belknap, M. D. [2] J. S. Reeves, M. D. [3] Leartus Connor, M. D.

Of the 46 correspondents who replied to the circular, 21 did not reply to either question 34 or question 35.

36.* Please state the average depth of water in wells in your locality, in each month of the year 1878.

37. In your locality, what is the ***usual average depth of earth above the ground water***, as indicated by distance down to water in wells, streams, etc.? If different parts of your locality vary greatly, please answer for such different parts.

38. Without reference to previous years, please state the facts concerning the ***depth of earth above the ground water*** nearest the surface, in your locality, during each month of the year 1878, as indicated by the distance down to water in wells, streams, etc., or by other facts. How many feet and inches do you estimate it, in each month?

39. Compared with previous years, in what months of the year 1878 was the ***ground water*** in your locality ***unusually high?***

40. Compared with previous years, in what months of the year 1878 was the ***ground water*** in your locality ***unusually low?***

From 34 correspondents replies were received to one or more of these 5 questions. An abstract from the replies and summaries of the replies are given in Exhibit 8, pages 174–5.

41. Please communicate facts bearing upon, or cases illustrating the causation or communicability of diseases.

42. Any suggestions which you may feel inclined to make, concerning methods which seem practicable, for the prevention of sickness or deaths, in your locality, or in this State, need not be withheld.

As stated after question 16, in the absence of positive knowledge, opinions are desired. The fact that it will be difficult, and sometimes impossible, to give the information asked for is well understood; the importance of the subject, however, warrants the request that each correspondent will take the care necessary to give definite replies to all the questions. The great value of a compilation of such replies must be conceded. It is believed that in this way may be accumulated data which eventually will be of great value to the people.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,
Secretary.

Of the 46 correspondents who replied to the circular, 18 made no statement in answer to questions 41 and 42. The replies by the other 19 correspondents may be briefly mentioned as follows:—

Dr. H. W. Jones, of Houghton, stated that much disease is caused by contamination of air and water with decomposing animal and vegetable substances. He mentioned the pollution of the lake with garbage. He also stated that

*The figures beginning paragraphs are the numbers of the questions in Circular 29, printed in smaller type on pages 150–176 of this Report. The replies, from which the summary is made, are printed on pages commencing with 179.

dysentery, diarrhea, cholera morbus, and cholera infantum make their appearance as soon as the traders come with their boats bringing stale and rotten fruits and vegetables; he suggested an inspection of the green stuffs sold on the boats. He also referred to the aggravation of disease, and the communication of contagious diseases by over-heated, foul, and ill-ventilated school-rooms, and suggested an investigation of this matter by the State Board of Health.

Dr. D. W. C. Burch, of Rockford, mentioned "general malaria in the country, occasionally from surface water," and suggested the cultivation of shade trees and flowers, and a rigid disinfection of privies.

Dr. G. W. Topping, of De Witt, referred to his report on the contagiousness of diphtheria, on page 85 of the Sixth Annual Report of the Secretary of this Board, and suggested a circular from the State Board of Health warning people of the danger of communication of diphtheria and scarlet fever by convalescents from these diseases going about too soon, in order to create a sentiment that would enable local boards of health to enforce a more protracted isolation of the mildly sick and of convalescents from these and other contagious diseases. The State Board of Health has already published and distributed throughout the State a document on the Restriction and Prevention of Scarlet Fever, and one on the Restriction and Prevention of Diphtheria, in which isolation of the mildly sick from both diseases and the danger of communication of scarlet fever by convalescents are urged, though perhaps not in language strong enough to make all understand the danger. The document on Restriction of Scarlet Fever is reprinted on pages xxix.–xxxii. of the Fifth Annual Report, that on Restriction of Diphtheria is reprinted on pages 86–89 of the Sixth Annual Report of the Board (for 1878).

Dr. I. N. Monfort, of Ithaca, Gratiot Co., reported an alarming epidemic of diphtheria, among the rich and cleanly as well as among the opposite class, but most among the filthy and those living on low land. He also stated that neuralgia and rheumatism prevail to some extent during the wet seasons of the year; and that typhoid fever occurs principally in old log houses with no ventilation underneath. He suggested that a good system of land drainage and a more thorough ventilation of houses would remove the greatest source of disease in his vicinity.

Dr. O. Marshall, of North Lansing, referred to his special reports concerning diphtheria and puerperal fever, on pages 125–7 and 133–4 of this volume. He also reported one fatal case of diphtheria, and 2 cases of typhoid fever, one of which was fatal, occurring in one house. The drinking-water used was carefully examined and found to be very foul. He could attribute these cases to "no other discoverable cause" than the use of this foul well-water.

Dr. G. E. Corbin, of St. Johns, reported a condition of school-rooms in his village, as regards ventilation and overcrowding, that would seem to demand the prompt attention of the local board of health.

Dr. R. B. Smith, of Webberville, stated that a large portion of the sickness in his vicinity is caused by the decay of vegetable matter in low swampy lands, and suggested thorough drainage, proper ventilation, and cleanliness as the best means of preventing sickness there.

Dr. W. R. Marsh, of Bay City, reported malarial diseases caused by the unsettled condition of the soil on account of grading of streets, ditching, etc. He stated that within 33 years there had been an increase of chronic pulmonary consumption and of cancerous diseases.

Dr. N. D. Lee, of Saginaw City, referred to malarial poison, surface water, sewage, barn poisons and privy poisons as causes of diseases, but stated that they were all growing less every year,—certainly a fortunate condition for a growing city.

Dr. J. S. Caulkins, of Thornville, reported in detail cases of typhoid fever which in his opinion indicated that the air may sometimes be a vehicle for the communication of the poison of this disease. For the prevention of malarial diseases he suggested that a belt of trees be either planted or left in clearing on the west side, or on that side of the house from which the prevailing winds blow.

Dr. W. A. Neal, of Dayton, suggested drainage, sewerage, disinfection, and cleanliness of cellars as a protection against contagious diseases. As illustrating the ignorance and carelessness of people in regard to sanitary matters, he reported 3 cases of typhoid fever, one of which was fatal, one case of malarial fever with typhoid symptoms, and one fatal case of diphtheria occurring in two families which used water drawn through a hole in the ice of a small lake over the edge of which and near the hole from which the water was drawn are several barns and privies.

Dr. Thomas H. Briggs, of Mattawan, reported a rapid increase of cancerous diseases, which he attributes to the eating of potatoes diseased from the ravages of the Colorado potato bug and from the use of Paris green and other poisons for the destruction of the bug.

Dr. Milton Chase, of Otsego, suggested that as a means of increasing the power of the health officer to enforce hygienic laws, the health officer be appointed by the Governor.

Dr. R. F. Stratton, of St. Joseph, wrote of the improvement in sanitary conditions made and to be made by drainage, in Berrien county. He said that there are in the county many unused millponds full of decaying logs and sawdust, and which keep back a great deal of water from the streams below, in the vicinity of which occur, during the warm months, intermittents, remittents, and bowel complaints among children. He suggested that it is the duty of boards of health to treat these as nuisances.

Dr. J. W. Falley, of Hillsdale, reported an outbreak of about 30 cases of scarlet fever, some of which were fatal, derived from one case so mild that the patient, a girl 15 years old, was not confined to her bed. In the younger children of the family where this first case occurred were three very malignant cases (one fatal); and in the older children, two other mild cases. One of the fatal cases was a woman aged 30 years.

Dr. C. W. Backus, of Three Rivers, stated that greater care should be used in disinfecting clothing where there exists any contagious disease. He stated that the first cases of diphtheria in that village in 13 or 14 years were contracted from clothing which a lady who had lost a child from diphtheria two months before, took from a trunk to air; four cases occurred, three fatal.

Dr. S. C. Van Antwerp, of Vicksburg, Kalamazoo county, stated that their malarial atmosphere complicates most diseases; as in cases of headache, pain often taking the place of chill, and fever following every other day. He suggested the planting of certain kinds of trees to absorb the malarial poison.

Dr. Edward Batwell, of Ypsilanti, questioned the propriety of quarantine in cases of scarlet fever. He is the only correspondent of the Board who expresses such a view.

Dr. W. H. Rouse, of Detroit, stated that the suppression of small-pox in

Detroit in 1877 suggests the possibility of keeping the disease entirely in abeyance. He also stated that from the examination of a great number of children who sought admittance to the public schools under the rule excluding those who could not present a physician's certificate that they had been properly vaccinated, he was convinced that there are many who deem themselves duly protected while they carry nothing more than the scars of wounds of the instruments used by the vaccinators. He suggested that much might be done toward securing a universal vaccination by the recommendations of those high in authority, to induce all people to have their children vaccinated with bovine virus. As he refers to the State Board of Health in this connection, it may here be stated that the Board acted on this subject in July, 1877, by the adoption of the following preamble and resolution, which it has since freely distributed throughout the State:

THE PREVENTION AND RESTRICTION OF SMALL-POX.

At the regular meeting, July 10, 1877, the Michigan State Board of Health adopted the following preamble and resolution:—

WHEREAS, By means of vaccination and revaccination the people may secure complete immunity from small-pox,—

Resolved, That all local boards of health be advised and requested to direct their health physicians to offer, every year, vaccination with bovine vaccine virus to every child not previously vaccinated, and to all other persons not vaccinated within five years, without cost to the vaccinated, but at the general expense of the locality, as provided for townships in section 1736, compiled laws, 1871.

(Reliable bovine vaccine virus can be obtained of Dr. George E. Ranney, Lansing, Michigan.)

HENRY B. BAKER, *Secretary*.

Office of the
SECRETARY OF THE STATE BOARD OF HEALTH,
Lansing, Michigan, August, 1877.

The Legislature in 1879 passed an act (No. 146):—

"That the board of health in each city, village, and township may, at any time, direct its health officer or health physician to offer vaccination with bovine vaccine virus to every child not previously vaccinated, and to all other persons who have not been vaccinated within the preceding five years, without cost to the persons [person] vaccinated, but at the expense of such city, village, or township, as the case may be."

It would seem that nothing is now lacking to secure almost complete protection from this disease, except prompt and proper execution of the law by local boards of health, and the creation of an enlightened public sentiment on the subject.

For convenience of study and reference, the replies to the circular have been grouped by geographical divisions of the State, which divisions are shown in Exhibit 1, page 153. It should be remembered that the Board assumes no responsibility for opinions or theories expressed by those who reply to its circulars, but its correspondents have been selected with great care, and include many of the leading physicians in the State.

The replies to Circular 29 are as follows:—

UPPER-PENINSULAR DIVISION OF THE STATE.*

REPLIES BY H. W. JONES, M. D., OF HOUGHTON, MICH.

1.† 2,000.
2. 45.
3. Portage township.
4. About 20 per cent less than during 1877.
6. Scarlatina and typhoid fever.

* For counties included in each division, see Exhibit 1, page 153.
† The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

7. *Typhoid fever, due to the excessively warm and open Winter and the hot Summer favoring decomposition.
8. Cholera infantum.
9. I can give no reason.
10. Scarlatina and typhoid fever.
11. From typhoid fever, the warm and open Winter and the hot Summer favoring decomposition.
12. Cholera infantum.
13. I cannot say.
14. Typhoid fever in September, October, and November; mortality slightly increased. Scarlatina in May and June, very prevalent; mortality usual.
16. Scarlatina, whooping-cough, and typhoid fever were very prevalent. I cannot give the number of cases.
17. Small-pox, cholera, cerebro-spinal meningitis, and diphtheria.
18. *January:* Influenza, measles, bronchitis, whooping-cough, consumption, pneumonia, and rheumatism.
February: Influenza, bronchitis, whooping-cough, tonsilitis, neuralgia, consumption, measles, neuralgia, pneumonia, neuralgia, meningitis, diarrhea, and rheumatism.
March: Influenza, bronchitis, scarlatina, tonsilitis, gastro-hepatic catarrh, consumption, pneumonia, rheumatism, diarrhea (catarrhal), neuralgia, croup, and meningitis.
April: Influenza, scarlatina, bronchitis, pneumonia, catarrhal diarrhea, consumption, croup, tonsilitis, rheumatism, and erysipelas.
May: Scarlatina, diphtheritic sore-throat, bronchitis, typhoid fever, pneumonia, influenza, consumption, diarrhea, erysipelas, and dysentery.
June: Influenza, bronchitis, scarlatina, diphtheritic sore-throat, diarrhea, dysentery, consumption, cholera infantum, cholera morbus, pneumonia, erysipelas, and rheumatism.
July: Scarlatina, diarrhea, cholera morbus, consumption, influenza, bronchitis, and tonsilitis.
August: Cholera morbus, cholera infantum, diarrhea, dysentery, scarlatina, consumption, bronchitis, tonsilitis, typhoid fever, and influenza.
September: Influenza, diarrhea, dysentery, cholera morbus, cholera infantum, bronchitis, consumption, scarlatina, rheumatism, and erysipelas.
October: Influenza, bronchitis, typhoid fever, diarrhea, croup, pneumonia, consumption, scarlatina, rheumatism, enteritis (catarrhal), neuralgia, erysipelas, and cerebro-spinal meningitis.
November: Influenza, bronchitis, pneumonia, scarlatina, typhoid fever, remittent fever, consumption, neuralgia, and catarrhal diarrhea.
December: Influenza, bronchitis, neuralgia, chicken-pox, typhoid fever, rheumatism, scarlatina, pneumonia, and consumption.
19, 21, and 22. No.
24. No. These months are our severest during the winter.
25. During July and August hog cholera and chicken cholera.
26. Very little grain is raised here, none was affected, to the best of my knowledge.
27. Good.
28. None that I know of or can ascertain.
31. Hay very good in every respect.
32, 33. No regular observations are taken here; the whole year was unusually dry and mild.
36. The wells here are nearly all surface wells; many of them were totally dry during the whole summer.
37. The country is very mountainous, and the depth of earth varies to the greatest extent, from bare rock to 60 feet and over.
41. It is only too evident in this district that much disease is caused by decomposing animal and vegetable substances which infect both our air and water. Our surface-soil is laden with decomposing matter, we have no system of drainage, and apparently no laws to enforce cleanliness around premises, as the board of health is composed of men who do not understand hygiene, and cannot be taught the necessity or the usefulness of it to the public health. Our wells and privy-houses are in too close proximity to avoid contamination of our drinking-water; our lake, which is nearly stagnant, is being gradually infected by having tons of garbage drawn on the ice in Winter to sink in the Spring; and the sawmills run their sawdust into the lake

*The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-1[illegible] Report. A summary of the replies is printed on pages 150-179.

at pleasure,—all of which must contribute greatly to the infection of both air and water. Until we have efficient health officers, who are not afraid to do their duty, disease in our hot summer months must be expected in severe forms. The steamboats which come from the lower lakes sell to the eager vegetarians in this district any quantity of stale and rotten fruits and vegetables, and dysenteries, diarrheas, cholera morbus, and cholera infantum immediately make their appearance as soon as the traders appear on the boats. Much good might be done by inspecting such green stuffs as are sold on the boats coming into port, and destroying such as is not fit to eat.

One point of great interest is the ventilation of school-rooms, and the mode of heating them. I have carefully watched the outbreak of several contagious diseases, and I find that a large majority of the cases can be clearly traced to a super-heated, foul-smelling, ill-ventilated school-room. It is astonishing to find that the complaints which come forth so unanimously from teachers scholars, and parents touching these all-important facts, are so universally disregarded by the school boards. At the present time in an epidemic of mumps now prevailing here, nine-tenths of the cases can be traced to its contraction in school, and the complaint of bad air comes forth from the youngest scholar. I think that a thorough investigation of this matter by the State Board of Health would save innumerable lives, and prevent many disagreeable sequels to those who escape with their lives from the many diseases which children are heir to, and which they so often communicate to one another at school. It would mark forever, with esteem, the partakers in so humane a cause, as giving an increased chance of life and health to those who are too young to be able to discriminate good from bad, and trust to their elders and superiors for the rights and benefits they may enjoy, and may be able to transmit in turn to others.

I have used the utmost care in order to make my replies as accurate as possible.

Respectfully submitted,

H. W. JONES, M. D.

Houghton, Houghton Co., Mich., June 25, 1879.

WESTERN DIVISION OF THE STATE.*

REPLIES BY HENRY KREMERS, M. D., OF DRENTHE, MICH.

1. I live in an unincorporated village.
2. I cannot estimate the number of deaths, but they were less than previous years.
3. Townships of Zeeland and Jamestown, Ottawa county, and contiguous parts of Overisel and Salem townships, Allegan county.
4. Considerably less than during 1877.
5. Less. Deaths probably one-fourth the usual ratio.
6. None.
8. Malarial diseases.
9. Drainage.
16. There were reported cases of scarlet fever of a very mild character. None came under my observation.
17. Small-pox, cholera, typhoid fever, measles, whooping-cough, cerebro-spinal meningitis, and diphtheria.
19. None.
21. I did not.
24. Not more than usual.
25. Puerperal fever during the hot summer months; none during cold weather.
26. None occurred in this locality. The grain crop was a good one.
27. It was good.
28. Not to my knowledge.
29. It was.
30. Very little, if any.
31. Less.
34. July, August, and September.
35. During the mild months of January, February, and March, 1878, the soil was very wet; but *unusually* wet during April.
37. From 10 to 100 ft.

Respectfully submitted,

Drenthe, Ottawa Co., Mich., July 29, 1879. HENRY KREMERS.

* For counties included in each division see Exhibit 1, page 153.

REPLIES BY A. VANDERVEEN, M. D., OF GRAND HAVEN, MICH.

1.* Population of this city estimated at 5,000.
2. The sexton reported 63 deaths to the city recorder.
3. City of Grand Haven and 8 or 10 miles country surrounding.
4. Much less in Spring and Summer; greater than usual in Fall; on the whole, diminished.
5. Less,—diminished by about one-third.
6. Bronchitis, pneumonia, and consumption,—deaths chiefly among the old residents of this city.
7. I cannot assign any cause.
8. Typho-malarial fever and cholera infantum.
9. The uniform temperature throughout the greater part of the year.
10. Bronchial consumption among the old people.
11. I cannot do so.
12. Pneumonia and whooping-cough.
13. The mild weather, and less than the usual malarial complications.
14. None to report.
15. None occurred.
16. Of scarlet fever, several; of typhoid fever, not to exceed 2; of whooping-cough, about 50.
17. Small-pox, cholera, measles, cerebro-spinal meningitis, and diphtheria.
18. *January:* Influenza, pneumonia, and bronchitis.
February: Influenza, remittent fever, and bronchitis.
March: Influenza, rheumatism, and remittent fever.
April: Intermittent fever, remittent fever, and neuralgia.
May: Influenza, Intermittent fever, and remittent fever.
June: Intermittent fever, diarrhea, and erysipelas.
July: Diarrhea, remittent fever, and intermittent fever.
August: Diarrhea, cholera infantum, intermittent fever, and remittent fever.
September: Diarrhea, cholera infantum, intermittent fever, and remittent fever.
October: Remittent fever, influenza, bronchitis, and dysentery.
November: Whooping-cough, bronchitis, and consumption.
December: Whooping-cough, bronchitis, and consumption.
19. None.
21, 24. No.
25. None.
26. I do not think any existed.
27. I don't know.
28. No.
29. Yes.
30. No.
31. Less.
32. I am unable to furnish meteorological conditions for 1878.
I cannot give satisfactory opinion as to the remaining questions.

Very respectfully yours,
Grand Haven, Ottawa Co., Mich., May, 1879. A. VANDERVEEN.

REPLIES BY ARTHUR HAZLEWOOD, M. D., OF GRAND RAPIDS, MICH.

1.* About 30,000.
2. The city clerk's record of burials gives 319.
3. City and part of the county district adjoining.
4. About the average.
5. About one-tenth below the average.
6. Diphtheria and whooping-cough.
8. Measles and scarlet fever.
10. Diphtheria,—record states 38 in number.
12. Measles and scarlet fever,—the latter 4 in number.
16. Impossible to state or approximate, in a city so large as this.
17. Small-pox and cholera.
18. *January:* Remittent fever, common colds, intermittent fever, rheumatism, dyspepsia, scarlet fever, and consumption.

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

February: Remittent fever, common colds, dyspepsia, bronchitis, consumption, scarlet fever, rheumatism, and diphtheria.
March: Common colds, remittent fever, dyspepsia, bronchitis, consumption, intermittent fever, rheumatism, and diphtheria.
April: Remittent fever, common colds, bronchitis, dyspepsia, intermittent fever, pneumonia, rheumatism, and scarlet fever.
May: Intermittent fever, remittent fever, common colds, bronchitis, consumption, and rheumatism.
June: Remittent fever, intermittent fever, common colds, consumption, rheumatism, diphtheria, scarlet fever, and dysentery.
July: Remittent fever, intermittent fever, common colds, consumption, bronchitis, diarrhea, pneumonia, and rheumatism.
August: Remittent fever, diarrhea, intermittent fever, common colds, cholera infantum, whooping-cough, pneumonia, and typhoid fever.
September: Remittent fever, intermittent fever, whooping-cough, common colds, diphtheria, diarrhea, consumption, dysentery, and rheumatism.
October: Remittent fever, common colds, whooping-cough, consumption, neuralgia, diphtheria, bronchitis, diarrhea, and dysentery.
November: Common colds, remittent fever, bronchitis, whooping-cough, consumption, neuralgia, diarrhea, diphtheria, and scarlet fever.
December: Common colds, remittent fever, bronchitis, whooping-cough, consumption, scarlet fever, rheumatism, and pneumonia.

19. None.
21. No.
24. Yes.

32. *Summary, for the year 1878, of certain Meteorological Conditions at Grand Rapids, Michigan, Prepared by Mr. L. H. Streng.*

YEAR AND MONTHS,—1878.	TEMPERATURE,—Degrees Fahr.								RAIN AND SNOW, Inches.	DAYS.					PREVAILING WINDS.
	MEAN.														
	Monthly.	Highest Daily.	Lowest Daily.	Highest.	Lowest.	Monthly Range.	Warmest Day.	Coldest Day.		Clear.	Partly Cloudy.	Cloudy.	Rainy.	Snowy.	
YEAR*	50.06	86.75	9.25	92	2	†43	Je 30	F 3	35.85	12	54	299	91	37	W.
January	29.14	39.50	9.25	50	4	46	19th	6th	1.02	1	5	25	3	8	S. 8
February	31.91	46.25	18.25	55	2	53	20th	3d	1.69	2	10	16	6	3	N. E. 8
March	42.48	60.50	21.50	72	21	51	9th	24th	4.05	0	6	25	13	0	E. 6 N. W. 6
April	53.84	67.75	41.25	77	34	43	6th	19th	5.54	1	3	26	10	0	E. 8
May	55.14	68.50	43.00	75	42	33	24th	10th	3.10	1	1	29	10	0	W. 9
June	65.34	82.00	50.50	92	47	45	30th	8th	2.32	2	5	23	10	0	S. W. 8
July	74.94	86.75	66.50	97	60	37	17th	2d	3.21	0	1	30	4	0	W. 9
August	70.83	79.25	60.25	89	53	36	8th	26th	2.08	3	4	24	9	0	W. 10
September	63.23	76.25	44.25	90	40	50	8th	27th	3.25	0	11	19	6	0	W. 12
October	48.86	70.25	32.25	84	23	61	1st	31st	5.20	2	7	22	15	0	W. 8
November	39.12	47.50	31.00	53	20	33	10th	27th	0.98	0	1	29	5	1	N. E. 7
December	25.89	37.00	15.25	39	11	28	2d	23d	3.41	0	0	31	0	25	W. 9

* [This line has been added, in the office of the Secretary of the Board, to the table prepared by Mr. Streng.]
† Average.

Grand Rapids, Kent Co., Mich., April, 1879. A. HAZLEWOOD.

REPLIES BY D. W. C. BURCH, M. D., OF ROCKFORD, MICH.

1.* Incorporated village (Rockford), 1,200.
2. Six.
3. Village of Rockford and surrounding country.
4. Less,—one-half or more.
5. Less,—one-half or more.
6. Diphtheria.
7. Epidemic; mainly.
8. Diphtheria.
9. Generally healthy season with little or no epidemics.
10. Mortality was less.
11.——.
12. Scarlet fever and diphtheria.
13. Sanitary measures.
14. Diphtheria, scarlet fever, and dysentery, lower the entire year.
15. None.
16. Of diphtheria, 4; of typhoid fever, 1.
17. Small-pox, cholera, scarlet fever, measles, whooping-cough, and cerebro-spinal meningitis.
18. Diphtheria in September; in other months intermittents were the prevailing diseases.
19. None.
20. Nothing of the kind.
21, 22, and 23. None.
24. No.
25. Epizooty, a few cases, Spring and Fall.
26. Cabbage insect.
27. Good.
28. No.
29. Yes.
30. Average.
31. Less.
32. During the Spring we had more than the usual rain-fall; Summer and Autumn, average; Winter unusually steady and mild, with good snow-fall,—snow fell for 43 consecutive days.
33. January and February rather dry; March, medium; April and May, unusually wet; June, medium; July and August, unusually wet; September, October, and November, medium; December, unusually wet.
34. July 20th to October.
35. March, April, May, and July to the 20th.
36. Estimate, 3 feet.
37. In our village, about 12 feet; in the country around, 25 feet; village in the valley; country rolling.
38. 12 feet. In our locality it does not vary; we find water when we reach gravel, at the depth of about 12 feet.
39. It does not fluctuate.
40. It does not fluctuate.
41. General malaria in the country, occasionally from surface water.
42. Cultivation of shade trees and flowers, and rigidly disinfecting privies.

Respectfully yours,

Rockford, Kent Co., Mich., January, 1879. D. W. C. BURCH.

REPLIES BY G. W. TOPPING, M. D., OF DE WITT, MICH.

1.* An unincorporated village, population estimated at 300; population of township and village estimated at about 1,550.
2. One in village; 10 in township.
3. A circuit having the village of De Witt as its center and a radius of about 6 miles, comprising parts of the following named townships: De Witt, Olive, Riley, Victor, Watertown, and Bath.
4. Greater, about 25 per cent.
5. Greater, about 15 per cent.
6. Diphtheria.

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), o pages 150-176 of this Report. On pages 150-179 is a summary of the replies.

7. Diphtheria spread by contagion and non-isolation of patients.
8. Whooping-cough, especially if compared with 1877.
9. To lack of contagion, and immunity acquired by its prevalence in 1877.
10. Diphtheria.
11. Prevalence of contagion of diphtheria.
12. Whooping-cough.
13. Its lessened prevalence.
14. There have been many more deaths from diphtheria than is usual, owing to its prevalence, but only a small proportion of deaths for the number of cases of the disease. It commenced in July and continued through the year; was most prevalent in October and November.
15. Diphtheria, as stated above.
16. Estimated as follows: Of diphtheria, 130; of scarlet fever, 6; of typhoid fever, 5; of measles, 2; of cholera, none; of small-pox, none; of whooping-cough, none; of cerebro-spinal meningitis, 1.
17. Small-pox, cholera, and whooping-cough.
18. *January:* Bronchitis, pharyngitis, rheumatism, pneumonia, consumption, diarrhea, anemia, etc.
February: Bronchitis, pharyngitis, rheumatism, diarrhea, consumption, mumps, trachoma, dropsy, etc.
March: Bronchitis, pharyngitis, rheumatism, trachoma, pneumonia, remittent fever, intermittent fever, jaundice, ovaritis, consumption, etc.
April: Bronchitis, rheumatism, intermittent fever, pharyngitis, remittent fever, mumps, pneumonia, asthma, chicken-pox, puerperal fever, ascites, lithiasis, catarrhus uteri, dysmenorrhœa, metrorrhagia, indolent ulcers, hysteralgia, consumption (pulmonary), keratitis, strangury, anemia, etc.
May: Bronchitis, trachoma, intermittent fever, remittent fever, rheumatism, pneumonia, asthma, catarrhus uteri, consumption (pulmonary), indolent ulcers, scrofula, anemia, goitre, abortion, necrosis, hysteria, pleurodynia, concussion of brain, typhoid fever, eczema, keratitis, etc.
June: Anemia, intermittent fever, remittent fever, leucorrhœa, trachoma, typhoid fever, metrorrhagia, eczema, hysteria, consumption (pulmonary), pneumonia, neuralgia, gonorrhœa, fracture of arm, etc.
July: Diphtheria, intermittent fever, remittent fever, anemia, rheumatism, consumption (pulmonary), trachoma, endo-metritis, thrush, colic, scrofula, synovitis, fracture of arm, hysteria, hysteralgia, sun-stroke, dysmenorrhœa, abortion, asthma, erysipelas, puerperal fever, and eczema.
August: Diphtheria, intermittent fever, remittent fever, diarrhea, endo-metritis, dysentery, consumption (pulmonary), trachoma, lithiasis, synovitis, metrorrhagia, cerebral hyperemia, fracture of arm, puerperal fever, erysipelas, rheumatism, wounds, anemia, paralysis, bronchitis, pneumonia, scrofula, hysteria, etc.
September: Diphtheria, intermittent fever, remittent fever, diarrhea, bronchitis, rheumatism, dysentery, lithiasis, consumption (pulmonary), fracture of arm, synovitis, anemia, erysipelas, hæmaturia.
October: Diarrhea, diphtheria, intermittent fever, remittent fever, bronchitis, tonsilitis, dysentery, typhoid fever, anemia, hæmaturia, fracture of arm, consumption (pulmonary), puerperal fever, erysipelas, lithiasis, rheumatism, periostitis, endo-metritis.
November: Diphtheria, diarrhea, bronchitis, tonsilitis, neuralgia, intermittent fever, remittent fever, rheumatism, typhoid fever, consumption (pulmonary), hepatitis, hæmaturia, asthma, hysteralgia, periostitis, pneumonia.
December: Diphtheria, bronchitis, rheumatism, tonsilitis, neuralgia, pneumonia, consumption (pulmonary), whitlow, abscess, hæmoptysis, periostitis, dropsy, insanity, hysteralgia, erysipelas, scarlatina.
19 and 20. No yellow fever.
21. Nothing unusual or remarkable in the fevers.
22. No black or bloody vomit.
23 and 24. No.
25. Many horses had distemper and epizooty in November and December.
26. None.
27. Grains in unusually good condition for market.
28. No fungus on grains.
29. Yes, wheat was dry.
30. Less "banking" in bin than usual.
31. Hay was secured in fine condition.
32. I made no meteorological observations.

33. Very wet and muddy until about April 15, 1878. The driest months were August, September, July, and June,—in the order named.
34. August and first half of September.
35. January, February, and March.
36. Water in most wells but little affected by wet or dry weather. A few leach the surface water into them, when very wet; and a few do not afford sufficient water in a very dry time. The average depth of water in them is 2 or 3 feet.
37. Wells in village of De Witt vary from surface to water from 13 feet to 45 feet, and in township of De Witt from 8 feet to 60 feet, according to elevation of position. The surrounding townships vary full as much from surface to permanent water, which is usually found in quicksand.
38. Cannot with precision. In wet months and seasons the surface is saturated, and a shallow excavation in most places, say 4 or 5 feet, will partly fill with water; in dry seasons and months it varies from 8 feet to 60 feet to water, according to elevation.
39. January, February, and March.
40. August and September.
41. Refer to my report on contagiousness of diphtheria, page 85 of the Sixth Annual Report of the State Board of Health, for 1878.
42. I think diphtheria and scarlatina are often spread by convalescents from these diseases going about too soon. A circular from the State Board of Health warning people of this danger might do much to create a sentiment that would enable local boards to enforce a more protracted and careful isolation of the mildly sick and convalescent persons from these and other contagious diseases.

De Witt, Clinton Co., Mich., March 8, 1878. G. W. TOPPING, M. D.

REPLIES BY E. V. CHASE, M. D., OF ELSIE, MICH.

1.* I live in a village, not incorporated, with an estimated population of three hundred.
2. One in seventy-five.
3. A circuit of about five miles.
4. The average during the previous years.
5. Less.
6. Scarlatina.
7. I cannot.
8. Typho-malarial fever.
9. To strict sanitary measures.
10. Scarlatina.
11. I cannot.
12. Typho-malarial fever.
13. Enforcing sanitary measures.
14. During January, February, March, and April, scarlatina,—rate of mortality, low; also typho-malarial fever during the months of October, November, and December.
15. Cerebro-spinal meningitis, in February.
16. Of small-pox, none; of cholera, none; of scarlet fever, 150 cases; of typhoid fever, 20; of measles, none; of whooping-cough, 10; of cerebro-spinal meningitis, 1; of diphtheria, 50.
17. Small-pox, cholera, and measles.
18. *January:* Tonsilitis, typho-malarial fever, intermittent fever, and diphtheria.
February: Scarlatina, typho-malarial fever, intermittent fever, and cerebro-spinal meningitis.
March: Scarlatina, pneumonia, typho-malarial fever, and remittent fever.
April: Typho-malarial fever, scarlatina, and intermittent fever.
May: Scarlatina, intermittent fever, and remittent fever.
June: Scarlatina, intermittent fever, diphtheria, and tonsilitis.
July: Intermittent fever, remittent fever, and diarrhea.
August: Intermittent fever, remittent fever, diarrhea, and diphtheria.
September: Diphtheria, remittent fever, and intermittent fever.
October: Typho-malarial fever, intermittent fever, and cholera infantum.
November: Remittent fever, typho-malarial fever, and intermittent fever.
December: Typho-malarial fever, intermittent fever, and pneumonia.
19. No yellow fever.

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. On pages 150-179 is printed a summary of the replies.

20. It was noticed in about two-thirds of the cases of typho-malarial fever and remittent fever that they commenced usually with fœtid diarrhea, occasionally very dark and inky vomit.
21. I have.
22. There was a very dark vomit, and sometimes blood.
23. No evidence of contagion or infection.
24. No more than common.
25. None that I know of.
26. Smut in wheat and corn, to a limited extent.
27. In excellent condition.
28. No.
29. Yes.
30. No.
31. It was not.
32. There were no peculiar or unusual conditions.
33. (1.) July, August, September; (2.) May, June; (3.) January, February, March; (4.) April, October, November, December.
34. July, August, and September.
35. October and November.
36. About 3 feet.
37. From 10 feet to 20 feet.
38. In January, 8 feet; in February, 8 feet; in March, 7 feet; in April, 7½ feet; in May, 7½ feet; in June, 8 feet; in July, 8½ feet; in August, 10 feet; in September, 11 feet; in October, 11½ feet; in November, 10 feet; in December, 9 feet.
39 and 40. It seemed to compare favorably with previous years,—especially during the winter months, high; and during the summer and fall, low.

Yours very truly,

Elsie, Clinton Co., Mich., Feb. 3, 1879. E. V. CHASE.

REPLIES BY C. V. BEEBE, M. D., OF HOWELL, MICH.

1.* Village; 3,000 inhabitants.
2. Fifteen.
3. Towns of Howell, Marion, Genoa, Oceola, Cohoctah, and Iosco.
4. About the same.
5. About the same as the average.
6. Intermittent fever and remittent fever.
7. I cannot.
8. Scarlatina and diphtheria.
9. I cannot say, farther than that they did not come in epidemic form.
10. Typhoid fever and pulmonary consumption.
11. I cannot.
12. Scarlet fever and diphtheria.
13. Not coming in epidemic form.
14. Typhoid fever, high rate of mortality from September 1 to December 1.
15. Cerebro-spinal meningitis, in November.
16. Of small-pox, none; of cholera, none; of scarlet fever, 20; of typhoid fever, 50; of measles, none; of whooping-cough, 300 (estimate); of cerebro-spinal meningitis, 6 cases; of diphtheria, none.
17. Small-pox, cholera, measles, and diphtheria.
18. *January:* (1.) Influenza, (2.) rheumatism, (3.) pneumonia, (4.) typho-malarial fever, (5.) bronchitis, (6.) consumption, (7.) diphtheria, puerperal fever.
February: (1.) Bronchitis, (2.) influenza, (3.) pneumonia, (4.) consumption, (5.) rheumatism, (6.) intermittent fever, (7.) scarlatina.
March: (1.) bronchitis, (2.) intermittent fever, (3.) consumption, (4.) pneumonia, (5.) influenza, (6.) remittent fever, (7.) rheumatism, (8.) scarlatina, (9.) diarrhea, (10.) diphtheria.
April: (1.) Bronchitis, (2.) consumption, (3.) intermittent fever, (4.) rheumatism.
May: (1.) Intermittent fever, (2.) bronchitis, (3.) consumption, (4.) rheumatism, (5.) cerebro-spinal meningitis.
June: (1.) Intermittent fever, (2.) bronchitis, (3.) consumption, (4.) rheumatism.
July: (1.) intermittent fever, (2.) bronchitis, (3.) consumption, (4.) rheumatism, (5.) typho-malarial fever.
August: (1.) Intermittent fever, (2.) remittent fever, (3.) typho-malarial fever (4.) consumption, (5.) rheumatism, (6.) diarrhea, (7.) bronchitis, (8.) typhoid, fever.

September: (1.) Intermittent fever, (2.) remittent fever, (3.) typho-malarial fever, (4.) diarrhea, (5.) consumption, (5.) bronchitis, (8.) puerperal fever.

October: (1.) Intermittent fever, (2.) remittent fever, (3.) typho-malarial fever, (4.) rheumatism, (5.) whooping-cough, (6.) bronchitis, (7.) consumption, (8.) scarlatina.

November: (1.) Intermittent fever, (2.) remittent fever, (3.) bronchitis, (4.) whooping-cough, (5.) pneumonia, (6.) scarlet fever, (6.) cerebro-spinal meningitis, (7.) erysipelas, (8.) consumption.

December: (1.) Intermittent fever, (2.) pneumonia, (3.) consumption, (4.) bronchitis, (5.) influenza, (6.) whooping-cough. I must have been negligent in my reports in regard to whooping-cough, as there has been a large number of cases in this vicinity. I think physicians were called to but few of them, and those were complicated with pneumonia. I would, upon mature deliberation, estimate the number of cases at 300.

19. No.
20. ——.
21. No.
22 and 23. ——.
24. I think not.
25. Nothing epidemic.
26. Not any.
27. Fair.
28. No.
29. Yes.
30. Not known.
31. Should think *less*.
32. Did keep memoranda.
33. Did keep memoranda.
34. June, July, and August.
35. January, February, and March.
36. Not known.
37. 15 to 40 feet. I think the wells 15 feet deep are largely supplied by surface-water, as there is not that difference in the lay of the land.
38. Not known.
39. January, February, and March.
40. June, July, and August.
41, 42. ——.

Respectfully submitted,

C. V. BEEBE, M. D.

Howell, Livingston Co., Mich., Jan. 28, 1879.

REPLIES BY I. N. MONFORT, M. D., OF ITHACA, MICH.

1.* One thousand.
2. Eight.
3. Ithaca and vicinity.
4. Greater; probably increased 25 per cent.
5. Probably 40 per cent greater.
6. Diphtheria.
7. I cannot,—excepting the damp, open winter of 1877-8.
8. None, I believe.
9. ——.
10. Diphtheria.
11. I cannot.
12. None, that I am aware of.
13. ——.
14. Diphtheria prevailed during the whole year. The mortality for that disease was about the usual rate.
15. Diphtheria during the year. An influenza prevailed extensively in November and December.
16. Of typhoid fever, 12; of whooping-cough, I cannot state how many; of diphtheria, 200 or more. I had seventy cases of diphtheria in my own practice in 1878, and I presume my estimate of cases treated by other physicians and those which had no physician is small enough.

*The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

17. Small-pox, cholera, scarlet fever, measles, and cerebro-spinal meningitis.
18. I have no data.
19. No cases occurred.
20. ———.
21. No.
22 and 23. ———.
24. I noticed nothing unusual in that respect.
25. A distemper prevailed among horses in December.
26. I heard of no special complaint.
27. Good.
28. Not unusually so.
29. It was.
30. It did not "bank."
31. Generally well secured.
32. I cannot.
33. August, September, October, July, November, December, May, June, April, January, February, and March.
34. It was not unusually dry any time last year.
35. January, February, and March.
36. It depends upon the soil-moisture. The wells are from 10 feet to 40 feet deep. When very wet they are full, and when dry they are very low.
37. About 12 feet, I think. South and west of the village of Ithaca it would be greater.
38. I cannot answer definitely. I may state that in very dry seasons many wells go entirely dry, and water becomes very scarce. An artesian well has been sunk to supply the village at such times, and it affords a supply of water at 700 feet.
39. January, February, and March.
40. At no time, I think.
41. Diphtheria has prevailed quite alarmingly, and the rich and cleanly have suffered with the opposite class; yet the filthy, and those living upon low, flat land have suffered most in this vicinity. In fact, drawing a line from north to south through the village of Ithaca throws nearly all cases of diphtheria to the east on the low lands.* Neuralgia and rheumatism prevail to some extent during the wet seasons of the year. Typhoid fever occurs principally in old log houses with no ventilation underneath. Probably a good system of land drainage and a more thorough ventilation of dwelling-houses would remove the greatest source of disease in this vicinity.

Very respectfully,

Ithaca, Gratiot Co., Mich., April 28, 1879. I. N. MONFORT.

REPLIES BY O. MARSHALL, M. D., OF NORTH LANSING, MICH.

1. That part of the city of Lansing called North Lansing contains about 2,500 inhabitants.
2. About 30.
3. The first ward and part of the fourth and the fifth wards in the city of Lansing, and from four to six miles into the adjoining townships of Lansing, Delta, Watertown, and De Witt.
4. About the same as for the last three years.
5. About an average with the amount of sickness.
6. Diphtheria, puerperal fever, influenza, and pneumonia.
8. Typhoid fever.
9. I can give no reason.
10. There were more deaths from diphtheria than in other years, but not in proportion to the number of cases.
15. Diphtheria and epidemic influenza.
16. Of small-pox, 1; of scarlet fever, 8; of typhoid fever, 4; of diphtheria, 58; of whooping-cough, 2.
17. Cholera, measles, cerebro-spinal meningitis.
18. Those most prevalent were:—

January: Intermittent fever, bronchitis, rheumatism, consumption, pneumonia.
February: Intermittent fever, bronchitis, pneumonia, rheumatism, consumption.
March: Intermittent fever, bronchitis, pneumonia, diphtheria, consumption.
April: Intermittent fever, pneumonia, bronchitis, consumption.

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*[This statement should be considered in connection with Dr. Marvin's reports of diphtheria in Gratiot county, on pages 111-115 of this Report.—H. B. B., Sec. S. B. of H.]

May: Intermittent fever, mumps, consumption.
June: Intermittent fever, mumps, pneumonia, rheumatism.
July: Intermittent fever, consumption.
August: Intermittent fever, diarrhea, diphtheria, remittent fever.
September: Intermittent fever, diphtheria, diarrhea, remittent fever, dysentery.
October: Diphtheria, intermittent fever, consumption.
November: Intermittent fever, diphtheria, bronchitis, consumption.
December: Influenza, diphtheria, bronchitis, pneumonia.

19.* No.

20. Did not observe any case of disease which caused me to think that I had anything like a case of yellow fever to treat.

21. No.

24. I did not notice that it was.

25. Poultrymen informed me that roup (a disease of the throat in fowls) was common among their poultry last fall.

26. None that I am aware of.

27. As usual in most years.

28. Not that I know of.

29. About the same as reported in former years.

30. About as usual.

31. No.

32–40. I did not observe.

41. See special reports on diphtheria and puerperal fever.†

42. Two cases of typhoid fever and one of diphtheria, with one death from typhoid fever and one death from diphtheria, occurred in the brick house on the south-west corner of block — in this city last fall. On examination of the well from which the family in this house obtained their drinking-water, I found it filled with decayed wood and other filth, with the remains of three dead frogs. The water in this well was clear when first drawn. A microscopic examination showed it to be filled with infusoria and organic matter. A pint bottle filled with the water became covered with a thick mould after standing three days, and had the odor of decomposing animal matter. To no other discoverable cause could these cases of disease be attributed.

North Lansing, Ingham Co., Mich., May 28, 1879. O. MARSHALL.

REPLIES BY A. W. NICHOLSON, M. D., OF OTISVILLE, MICH.

1. Five hundred.

2. Five.

3. Township of Forest.

4. 25 per cent less.

5. About the same as the average.

6. Diphtheria and diarrhea.

7. The unusual prevalence of diphtheria was due, I think, both to the slight regard among the people for the contagious influence of the disease, and to undefined atmospheric conditions. A mitigation of the disease was observed during a prevalence of a north wind. The extreme heat of the summer term seemed to have a marked influence upon the severity and prevalence of diarrhea among children.

8. Intermittent fever, typhoid fever, typho-malarial fever, and pneumonia.

9. I should consider the causes of the lessened prevalence of intermittent fever, typhoid fever, and typho-malarial fever as having their principal origin in certain atmospheric conditions, as apparently the same sanitary surroundings existed as during years previous when there was a greater prevalence. The extreme mildness of the early months seemingly accounts for the less frequent occurrence of pneumonia.

10. Diphtheria and diarrhea.

11. Facts coming under my observation justify me in affirming that the unusual mortality from diphtheria was owing to a general neglect to procure medical aid at or near the time of attack, and to remission of attention at time of convalescence. Deaths from diarrhea principally occurred among infants under 7 months of age, and during the months of August and September. The high temperature of those months coupled with the molimen of teething was likely the cause of the increased mortality in this disease.

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* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150–176 of this Report. A summary of the replies is printed on pages 150–179.

† Pages 126–7 and 133–4 of this volume.

12. There was less than the usual mortality from fevers in general, and from pulmonary diseases.
13. Perhaps to a lessened humidity of the atmosphere at the time when these diseases were most prevalent.
14. A less than usual mortality from pulmonary difficulties in February, March, and April, the rate being low. An unusual mortality among cases of diarrhea in August and September, although the rate was not unusually high.
15. No appearance of disease not usually occurring in this locality, unless mention may be made of diphtheria, which has been prevalent for many months in this locality.
16. Of scarlet fever, one case; of whooping-cough, five cases; of diphtheria, probably forty cases.
17. Small-pox, cholera, typhoid fever, measles, cerebro-spinal meningitis.
18. *January:* Bronchitis, diphtheria, intermittent fever, pulmonary consumption.
February: Diphtheria, bronchitis, pulmonary consumption.
March: Bronchitis, pulmonary consumption.
April: Pulmonary consumption, bronchitis, intermittent fever, diarrhea, diphtheria, erysipelas.
May: Intermittent fever, bronchitis, pulmonary consumption, diarrhea, diphtheria.
June: Whooping-cough, intermittent fever, pulmonary consumption, diarrhea, rheumatism.
July: Whooping-cough, intermittent fever, pulmonary consumption, diarrhea, diphtheria, bronchitis.
August: Intermittent fever, whooping-cough, diarrhea, pulmonary consumption, bronchitis, pneumonia.
September: Intermittent fever, diarrhea, bronchitis, pulmonary consumption, whooping-cough, rheumatism, remittent fever, typho-malarial fever, dysentery, erysipelas, pneumonia.
October: Intermittent fever, bronchitis, pulmonary consumption, remittent fever, rheumatism, diphtheria, diarrhea, typho-malarial fever.
November: Bronchitis, influenza, pulmonary consumption, diphtheria, intermittent fever, diarrhea, rheumatism, whooping-cough.
December: Bronchitis, diphtheria, consumption, influenza, neuralgia, whooping-cough, rheumatism, erysipelas.
19, 20, 21, 22, and 23. ———.
24. It was not.
25. I cannot ascertain that disease among animals prevailed to any noticeable extent.
26. None of any account.
27. Fair.
28. They were not.
29. Much of the wheat was some damp when threshed.
30. I have heard no complaint about wheat banking in the bin.
31. Rather more than usual.
32. See my meteorological reports for this station. [From these reports the following summary, on page 192, has been made in this office.--H. B. B., Sec.]
33. I have kept no record for 1878.
34. I did not observe any unusual dryness.
35. In the months of June and July.

Otisville, Genesee Co., Mich., July 1879. A. W. NICHOLSON.

SUMMARY for the Year 1878 of Certain Meteorological Conditions at Otisville, Genesee Co., Michigan.

YEAR AND MONTHS, 1878.	Temperature, Degrees F.				Humidity of Atmosphere.[a]		Atmospheric Pressure—Inches.[a]	Per Cent of Cloudiness.[a]	Prevailing Winds.[e]	Ozone.[f]		Rain and Melted Snow, Inches.
	Average.[a]	Extremes.[b]		Range.	Relative.[c]	Absolute.[d]				Day.	Night.	
		Highest.	Lowest.									
YEAR	48.22	99	—11	110	81	3.76	29.040	60	N. W. 941 S. E. 190 S. W. 179	3.98	4.40	37.63
January	25.02	19 51	6 —11	62	91	1.76	29.137	73	N. W. 22 S. E. 19	4.42	4.90	1.00
February	27.55	28 49	3 —5	54	87	1.88	29.063	57	N. E. 16 N. W. 15	6.04	5.89	2.66
March	40.71	10 75	25 13	62	80	2.68	28.998	69	S. E. 19 N. W. 17	6.29	7.06	2.35
April	52.46	20 79	5 26	53	69	3.52	28.926	59	N. W. 22 S. E. 19	4.77	6.03	3.22
May	54 50	3 79	13 25	54	66	3.60	29.013	63	N. W. 22 S. E. 16	4.45	5.39	3.30
June	64.59	30 95	9 31	64	69	5.02	29.101	54	S. E. 27 N. W. 22	3.60	3.57	4.65
July	72.53	18 90	23 46	53	80	6.98	29.123	50	N. W. 27 S. W. 15	3.10	3.21	5.55
August	69.46	9 91	26 40	51	79	6.26	29.009	38	N. W. 29 S. W. 22	3.03	2.43	3.24
September	62.70	2 91	28 32	59	81	5.35	29.171	51	S. E. 28 N. W. 15	2.80	2.86	4.52
October	50.21	1 82	28 20	62	87	3.95	29.088	52	S. W. 24 S. E. 18 N. W. 17	2.45	3.20	2.96
November	36.28	11 56	5 15	41	85	2.43	29.145	65	N. W. 20 W. 16 S. W. 15	3.41	4.07	2.50
December	22.65	1 49	24 —1	50	97	1.72	28.700	83	W. 20 S. W. 20	3.43	4.23	1.68

[a] Average of 3 observations, at 7 A. M., 2 P. M., and 9. P. M., daily.

[b] By registering thermometers. The small figures above and at the right of the numbers stating the highest or the lowest temperature denote the day of the month on which the highest or the lowest temperature occurred.

[c] Per cent of saturation.

[d] Grains of vapor in a cubic foot of air.

[e] The figures following letters stating the prevailing direction of the wind denote the number of observations the wind was observed to be in the direction stated. Three observations were made daily.

[f] By exposure of test-paper made according to Schönbein's formula, from 7 A. M. to 2 P. M. for the day observation, and from 9 P. M. to 7 A. M. for the night observation.

REPLIES BY G. E. CORBIN, M. D., OF ST. JOHNS, MICH.

1.* The population of the village of St. Johns is about 3,000. The population of the township of Bingham, in which St. Johns is situated, I estimate (including 3,000 inhabitants located in the village) at 5,390, as said township contains 1,078 registered voters.

2. The number of deaths in the township of Bingham, including the village of St. Johns, during the year 1878 has recently been returned by Supervisor Upton at

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

seventeen (17). As the names, ages, and causes of deaths are now on record, I have been able to correct Mr. Upton's list by the addition of four names, which he should not have omitted. Of these 21 persons, two were still-born infants. Deducting these, it appears that the ratio of mortality to the population in this township was only about *three and one-half to the thousand.* The above figures have been collected with much care, and may be relied upon as very nearly accurate. *Ten* of these 19 persons were upwards of 60 years of age, and died of dropsy, paralysis, and other diseases incident to the breaking down of the system from old age. Of the younger persons, two died of typhoid fever; two, of scarlet fever; two, of consumption; and two infants died, one of "bowel complaint," and the other of congestion of the lungs.

3. For the township of Bingham.

4 and 5. About the same as the average.

6. None.

17. Small-pox, cerebro-spinal meningitis, and cholera.

18. I am unable to make the statement solicited.

19, 21, 24. No.

25. I am unable to state.

26. To the best of my knowledge, there was no noticeable trouble of the kind mentioned.

27. Excellent.

28. I think not.

29. Yes.

31. No trouble of the kind, I think.

33. I cannot answer this question as accurately as you request. My notes show that during January, February, and March "sloppy weather" and deep mud prevailed. The greatest rainfall was in April, when it rained nearly one-half of the time. There were light showers in June and July, with the earth quite dry most of the time. The drought was somewhat injurious in August.

35. In April.

36. As our well-water is all reached in quicksand, by digging or boring through a heavy superincumbent stratum of clay, its height varies but little throughout the year

37. From ten to thirty feet.

41, 42. Under these heads I deem it my privilege and duty to relate the following facts. Within the school district intended for the accommodation of this village, reside pupils of legal school age to the number of nearly 700. (The exact number returned for the year 1877 was 656; for the year 1878, 674.) For the accommodation of these pupils, and some additional ones from abroad, we have three school buildings with an aggregate floor space of only 7,768 square feet. If these rooms were all provided with suitable facilities for heating and ventilating (which is not the case), with the ten teachers employed, they would afford healthful accommodations for only about 300 pupils! The necessary result of such overcrowding is to transfer many names from the school register to the "sick list." The consequent loss of time is very great; and the irreparable damage to the constitution from its continued subjection to such depressing influences, is lamentable in the extreme. In such schoolrooms, thus overcrowded, *suffocation*, or drafts of *cold air* on the *heads* of *the pupils* from open windows, are the alternatives. The results of the latter are numerous, and are manifested in catarrh, bronchitis, pneumonia, etc. On the 11th day of January last, one of our teachers consulted me professionally, desiring relief from an aggravation of bronchial trouble. The school-room in which this teacher presides contains only 728 square feet of floor space (26x28 feet), on which, at that time, were crowded between 55 and 60 pupils daily. Incident to a suitable professional examination, the following statement was elicited from said teacher: "On the coldest days during our recent cold weather, when it became necessary to close doors and windows in order to keep warm, the atmosphere in my room was *terribly foul, awful, nearly suffocating!*"

On the same floor is another school-room of the same size, in which, during the month of May just closed, the average daily attendance was 65. In allusion to the condition of this room, the preceptress of the grammar department, no longer ago than yesterday expressed the following opinion, and, according to the best of my recollection, in the exact language here quoted: "I don't see how they can endure it. I sometimes drop in there at recess, and I find the atmosphere fearfully bad, so bad that I do not like to remain." In the month of May, 1875, which was prior to the erection of our third school-building, the average daily attendance in this little room was 83, and 95 were sometimes present at the same time. I have watched the condition of this room for years, and have observed that it takes but a short service to make the teacher look old and care-worn. The above facts have been fully and frequently presented to the district, and yet the needed additional room has been

invariably refused! This last statement may seem incredible, nevertheless 'tis true. Any attempted explanation would be out of place here; but the facts above related bear so directly and forcibly upon the subject for the investigation of which the State Board of Health was instituted, that in justice to humanity I can do no less than to make the record. Very truly,

St. Johns, Clinton Co., Mich., June, 1879. G. E. CORBIN, M. D.

REPLIES BY R. B. SMITH, M. D., OF WEBBERVILLE, MICH.

1.* Unincorporated village. Estimated number of inhabitants, 350.
2. 7.
3. East half of Le Roy, South part of Locke (Ingham Co.), west part of Conway and Handy (Livingston Co.)
4, 5. Less, 25 per cent.
6. Small-pox.
7. Contagion.
8. Bronchitis and pneumonia.
9. I can give no good reason.
10. None except small-pox.
11. I can assign no cause.
12. Pneumonia and bronchitis.
13. Less number of cases and mild type of disease.
14. In February and March, bronchitis and pneumonia; rate low.
15. In June, small-pox; in December, diphtheria.
16. Of small-pox, 7 cases; of typhoid fever, 8 cases; of diphtheria, 6 cases.
17. Cholera, scarlet fever, measles, whooping-cough, cerebro-spinal meningitis.
18. I have not sufficient data to give a correct answer.
19, 20. None.
21, 22, 23, 24. No.
25. Influenza in December among horses.
26. None; at least, no more than usual.
27. Good, except wheat; wheat was damp.
28. None that I know of.
29. No.
30. I do not know.
31. Rather more.
32. I cannot give definite answers.
33. June, August, and September were the driest; February, May and July, the next driest; January and December, the next; next, March, April, October, and November.
34. I think that there was no time when the soil was unusually dry.
35. Same as 34.
36. About 4 feet.
37. From 14 to 20 feet.
38. There is so much difference in the depth of wells in this vicinity that it is impossible for me to give anything like an accurate estimate of depth of soil above water for the year 1878.
39. March, April, and May.
40. None.
41. In regard to the causation of disease, I would say that there is considerable low swampy land in and around this place, causing the decay of a large amount of vegetable matter each season, which, in my opinion, causes a large portion of our sickness.
42. Thorough draining, proper ventilation, and cleanliness, I think the best methods of preventing sickness in this locality.

Webberville, Ingham Co., Mich., January, 1879. R. B. SMITH.

BAY AND EASTERN DIVISION OF THE STATE.†

REPLIES BY W. R. MARSH, M. D., OF BAY CITY, MICH.

1.* About 15,500.
2. ———.
3. The limits of the corporation.
4. About an average.
5. The same as the average.
6. Consumption.

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.
†For counties included in each division see Exhibit 1, page 153.

7. Close houses and damp ground.
8. Miasmatic fevers and croup.
9. No epidemic prevailed, and there was a better state of living.
10, 11, 12, 13, 14, and 15. There were no uncommon diseases.
16. I cannot do it.
17. No cholera.
18. I cannot.
19. No.
20. No similar condition.
21. None.
22, 23. ———.
24. No.
25. I know of none.
26. Garden crops were excellent.
27. I cannot answer for farm lands.
28. ———.
29. Not as dry as some seasons.
30. On inquiry, I find it *less*.
31. Less. The crop was good.
32. I cannot. There is no observer in the city.
33. Have the usual Spring and Autumn rains.
34, 35. Quite uniform, an average of other years.
36. We have few wells; 5 feet of water; *wells 12 or 15 feet deep.*
37. 10 or 15 feet.
38. It does not vary much; the ground has quite a uniform surface under the city.
39, 40. Nothing to answer.
41. I know of no special facts as to what causes may be removed. Our city is quite new. Grading and ditching keeps the surface entirely unsettled, and experience renders it evident that the unsettled condition of the surface is such as to produce miasm or malaria; hence, all our diseases are largely of a malarial character. As that condition passes and miasm lessens, chronic pulmonary consumption and cancerous diseases, increase. Thirty-three years ago, or in 1844 and 1845, there were no consumptive cases and no typhoid fevers; every case was miasmatic. I know of no very definite reasons for this; but a general change from a new to an older settlement, and the changes of physical and social condition that prevail.

Bay City, Bay Co., Mich., April 16, 1879. WILLIAM R. MARSH.

REPLIES BY A. NASH, M. D., OF LAPEER, MICH.

1. Number of inhabitants, year 1878, 3,100.
2. Number of deaths, 25.
3. City limits.
4. Less than previous years. The year 1878 was one of unusual health in this vicinity. There was no epidemic; even the contagious diseases were of a very mild type, I may say scarcely communicable.
5. Ratio of deaths less.
6. None.
7. ———.
8. Intermittents, and other malarious affections.
9. Improved sanitary condition of city, and drainage of low lands lying contiguous to the city.
10. I can think of none.
11. None.
12. From the exanthematous fevers and diphtheria.
13. From the mildness of the above endemics.
14. None.
15. No unusual manifestation of disease.
16. No small-pox or cholera; of scarlet fever, a few and mild; of typhoid fever, none; measles and whooping-cough, mild; of cerebro-spinal meningitis, none; of diphtheria, perhaps a dozen cases, easily managed. I think we have not had an epidemic of any kind.
17. Small-pox, cholera, and cerebro-spinal meningitis.
18. I cannot answer.
19, 20. None.
21-24. No.
25. Not any, to my knowledge.
26. None.
27. Good condition.

28.* I think not.
29. I think it was generally damp and threshed early.
30. I do not know.
31. About the same as usual.
32, 33, 34, and 35. The entire season was unusually wet.
36. The wells in this vicinity are subject to the rainfall, the usual depth of water being about 3 feet.
37. About 25 or 26 feet.
38, 39, 40. I cannot answer.
41. No facts in this year's experience.

Very respectfully,

Lapeer, Lapeer Co., Mich., Feb. 12, 1879. A. NASH.

REPLIES BY J. M. LOOP, M. D., OF PORT SANILAC, MICH.

1.* Of the village, 500; of the township, 2,500.
2. In the village, 4; in the township, 7.
3. Village and township.
4. One-fifth less.
5. Less.
6. Paralysis.
7. I cannot assign any reason.
8. Typhoid fever.
9. Healthful season, and observation of sanitary measures.
10. Consumption.
11. I cannot.
12, 13. ——.
14. Pneumonia, low rate, in April, November, and December.
15. ——.
16 and 17. To my knowledge no cases of diseases mentioned have occurred.
18. *January* and *February:* Healthful with the exception of a few cases of colds and mild sore throat.
March: Intermittent fever and sore throat (not diphtheritic.)
April: Intermittent fever, pneumonia, and diphtheritic croup.
May: Intermittent fever.
June: Influenza.
July: Influenza and diarrhea.
August: Diarrhea and intermittent fever.
September: Intermittent fever, diarrhea, erysipelas, and typho-malarial fever.
October: Intermittent fever, diarrhea, rheumatism, typho-malarial fever, and influenza.
November: Typho-malarial fever, pneumonia, influenza, rheumatism, and bronchitis.
December: Pneumonia and rheumatism.
19. None.
20. ——.
21. I made no such observations.
22, 23. ——.
24. I did not notice that it was.
25. Animals have been quite healthy.
26. ——.
27. Most grains were marketed in good condition.
28. Wheat and corn were slightly affected by smut.
29. Yes, generally.
30. I have heard no remarks on the subject.
31. Less.
32. I did not observe any very peculiar or unusual conditions.
33. August, July, September, October, June, December, November, January, February, March, May, and April.
34. July and August.
35. March, April, and May.
36, 37, 38. ——.
39. April and May.
40. October.

Port Sanilac, Sanilac Co., Mich., Dec. 31, 1878. J. M. LOOP, M. D.

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

REPLIES BY N. D. LEE, M. D., OF SAGINAW CITY, MICH.

1. About 11,000.
2. 110.
3. City of Saginaw (incorporated name.)
4. Less. (See table.)
5. Average with 1875, 1876, and 1877; about 13 less without taking into account the increase of population, which is estimated at 500 to 1,000.

TABULAR STATEMENT (*nearly correct*).—*Causes of Deaths and Number of Deaths in Saginaw City, Mich., in the Years 1875, 1876, 1877, and 1878. (Estimated Population in 1877,—10,500, in 1878,—11,000.)*

Diseases as Recorded in Register.	1875.	1876.	1877.	1878.	Total.
All Causes	118	112	140	110	480
Abscess	----	----	----	1	1
Abscess of Bowels	----	----	1	----	1
Accidents	9	6	5	4	24
Asthma	----	----	----	1	1
Bifid Spine	----	----	1	----	1
Bladder, Inflammation of	----	----	----	1	1
Bowels, Inflammation of	3	3	6	1	13
Brain, Congestion of	1	----	2	----	3
Brain, Softening of	----	----	1	----	1
Bright's Disease	----	1	----	----	1
Cancer	1	1	1	1	4
Catarrh	1	----	----	----	1
Childbirth	----	2	----	----	2
Cholera Infantum	8	4	14	2	28
Cholera Morbus	----	----	4	----	4
Consumption	----	----	----	6	6
Consumption, Pulmonary	13	11	20	----	44
Cramps	4	----	4	----	8
Croup	1	----	----	1	2
Cyanosis	----	----	1	----	1
Diarrhea	17	12	----	7	36
Diphtheria	1	----	----	6	7
Dropsy	----	2	1	----	3
Dysentery	4	----	8	1	13
Erysipelas	----	----	3	----	3
Fever, Intermittent or Malarial	3	6	----	----	9
Fever, Typhoid (Enteric), and, I presume, Typho-malarial	----	2	4	4	10
Fever, Typhus	1	----	----	----	1
Fits	2	4	----	1	7
Gravel	----	----	1	----	1
Heart Disease, result of Rheumatism in nearly all cases here	2	3	3	1	9
Hemorrhage	----	----	1	----	1
Hydrocephalus	----	----	----	1	1
Liver Complaint	----	4	----	----	4
Lungs, Congestion of	4	2	----	----	6
Meningitis	----	----	----	3	3
Meningitis, Spinal	----	----	----	2	2
Meningitis, Cerebro-spinal	8	5	4	----	17
Old Age	3	1	7	2	13
Ovarian Cyst	----	----	----	1	1
Paralysis	----	----	----	1	1
Pleurisy	2	----	----	----	2
Pneumonia	4	7	9	3	23
Pneumonia, Typhoid	----	----	3	----	3
Premature Birth	----	----	1	----	1
Rheumatism	2	----	2	1	5
Scarlatina	2	4	----	1	7
Septicæmia	----	----	----	2	2
Sore Mouth	----	----	1	----	1
Still-born	11	11	13	3	38
Suicide	----	1	1	----	2
Teething, probably Diarrhea	----	2	3	----	5
Whooping-cough	2	5	----	----	7
Unknown*	9	13	15	52	89

*The "unknown" reported for 1875, 1876, and 1877 were generally very young children; the "unknown" reported for 1878, include 50 buried in Roman Catholic and Jewish cemeteries and other places, concerning the causes of whose deaths no record was kept; but the causes will probably average with causes recorded on the register of our city burying-ground.

6.* Diphtheria.
7. Carelessness in diphtheria, many believing that it is not infectious or contagious.
8. Accidents, cholera infantum, consumption, and diarrhea, principally.
9. Healthy season.
10. None, except diphtheria.
11. I cannot, with certainty.
12. Nearly all the diseases of our climate.
13. Healthy season.
14. None.
15. I cannot.
17. Small-pox and cholera.
18. I cannot.
19, 21. 22, 23, 24. No.
25. None more than usual, excepting deaths from eating smut corn-stalks (ustilago maidis.)
26. None more than usual, excepting smut on corn husks and stalks.
27. Good.
28. More smut on corn than usual.
29. I believe so.
30. I don't know.
31. No.
32. I cannot.
33. I did not keep note of it.
34. It was not unusually dry.
35. It was not unusually moist.
36. From 2 to 5 or 8 feet where there are no sewers.
37. From 2 to 5 or 8 feet where there are no sewers.
38, 39, 40. I cannot, except about as usual.
41. Malarial poison, surface water, sewage, barn poisons and privy poisons, all of which are growing less every year.
42. It requires too long an answer to make in this report.

Respectfully yours,

Saginaw City, Mich., Dec. 31, 1878. N. D. LEE, M. D.

REPLIES BY JOHN S. CAULKINS, M. D., OF THORNVILLE, MICH.

3.* The township of Dryden and contiguous parts of Attica, Lapeer, and Metamora.
4 and 5. About the same as the average for the last two years, which is 20 per cent less than an extended average,—say for 15 years.
6. None, except influenza, of which there were several outbreaks, making in their total considerable more sickness than is usual from this cause in one year. The mortality was slight and confined exclusively to the very aged or the very young.
7. No reason can be assigned for the increased prevalence of influenza during the year; the cause of the disease is not known.
8. Besides the contagious diseases, of which very few cases were met with, pneumonia was decidedly less prevalent than usual.
9. With regard to the lessened prevalence of the contagious diseases, the explanation of the fact consists in the lack of exposure of unprotected individuals to the source of the virus; with regard to the cause of the lessened prevalence of pneumonia, I have no theory that is satisfactory even to myself.
10. None.
12. From the contagious diseases and from pneumonia.
13. To their lessened prevalence.
14, 15. There were none such.
16. Of scarlet fever, 3 cases; of typhoid fever, 10 cases; of measles, 20 cases; of whooping-cough, 5 cases; of dysentery, 6 cases; of diphtheria, 20 cases.
17. Small-pox, cholera, and cerebro-spinal meningitis.
18. *January:* Typho-malarial fever, intermittent fever, bronchitis, and pneumonia.
February: Influenza, intermittent fever, bronchitis, typho-malarial fever, and pneumonia.
March: Intermittent fever, influenza, bronchitis, pneumonia, typho-malarial fever.
April: Intermittent fever, bronchitis, diarrhea, typho-malarial fever.

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. On pages 150-179 is printed a summary of the replies.

May: Intermittent fever, bronchitis, diarrhea.
June: Influenza, intermittent fever, bronchitis, rheumatism.
July: Influenza, intermittent fever, diarrhea.
August: Diarrhea, intermittent fever.
September: Influenza, diarrhea, intermittent fever.
October: Influenza, intermittent fever, diarrhea.
November and *December:* Influenza, measles, and intermittent fever.

19, 20, 21, 22, 23, and 24. No facts bearing on these questions have been observed.

25. No disease or unusual mortality has been observed among animals, except some cases of poisoning of cattle during the months of November and December by smut in corn. The known fatal instances, say in a radius of six miles, are fourteen; others are heard of farther off, but have not been investigated. In the greatest number of the fatal cases, the cattle were turned into the lot where the rejected smut had been left on the ground; but in some later instances death was caused by feeding the smutty stalks. One *post-mortem* investigation was made by me, and in that case the most distinctive pathological change noted was gangrene of the peritoneal coat of the bowels. The diseased patches, which were small and scattered, were dry and of a shiny black color. There was very little observed with regard to the symptoms of these cases, for the cattle were generally found dead. There appears to be as yet no evidence that smut hurts horses or sheep.

26. Rot in potatoes, rust in wheat, smut in corn and oats, and mildew in grass.

27. The quality of nothing that was raised in the year 1878 was prime; the wheat, especially, compared with that of the preceding year, was decidedly poor. The quality of the other crops when ready for market or use was passable except hay, which was poorer than is often known.

28. Answered under 26. All the diseases there mentioned are fungi. With regard to extent, as compared with the mean of previous years, they were largely in excess in wheat, corn, and late oats; considerably in potatoes; and very greatly in hay. Buckwheat does not seem to be subject to the attack of any fungus. Rye is not raised in this section of the country.

29. Much of the wheat was not thoroughly dry when it was threshed.

30. The wheat raised in the year 1878 banked in the bin worse than usual.

31. More so. Poorer hay is seldom seen than that raised in 1878.

32. [See tabular summary, on page 200, in connection with the following general remarks.]

Year 1878.—The total precipitation of 1878 and the daily mean temperature of the year are both in excess of the figures for several years; with the temperature this is mainly due to the high means of March and April.

January.—A mild dry month, with much foggy weather and ground mostly bare of snow.

February.—A mild Winter month with more precipitation than January, and more fair weather.

March.—A warm wet month, with 15 stormy days, 12 rainy days, 3 snowy days; butterflies seen the 6th and frogs heard the 7th; plowing began the 20th.

April.—A warm dry month, no frost; peach trees in blossom the 6th.

May.—Not so warm for the season as April; always cold in the shade; frost every night from the 11th to the 17th inclusive.

June.—A pleasant equable month; only three days that the mercury was above 85°, and three that the daily mean was below 54°; there was frost the 6th; much sunshiny weather.

July.—A hot month, the last week wet.

August.—A very dry dusty month, not excessively hot; only 5 rains and one entirely cloudy day; no daily mean over 80°.

September.—A temperate month with sufficient rainfall for agricultural work; a killing frost the 20th.

October.—A dry month, cold towards the close; heavy frost the 6th.

November.—A cold cloudy month; first snowstorm the 25th.

December.—A severe winter month.

33. January, August, May, April, October, June, November, December, February, September, July, and March.

34 and 35. Compared with previous years, the soil moisture was at no time unusually dry in 1878; but as compared with the last five or six years it was nearly all the time more than usually moist.

36. No measurements have been made from which to answer this question.

37. 20 feet to 100 feet.

38. Answered like 36.

SUMMARY, for the Year 1878, of Certain Meteorological Conditions at Thornville, Lapeer Co., Michigan,—Latitude 42° 55′; Longitude 83° 10′ W.

Year and Months, 1878.	Temperature,—Degrees Fahrenheit. Extremes.[a] Highest.	Lowest.	Range.	Average.[b]	Humidity of Atmosphere.[b] Relative.[c]	Absolute.[d]	Ozone, Average of Day and Night Observations.	Prevailing Winds.[e]	Sunshine. Per Ct. from Sunrise to Sunset.	Days all Clear.	Days all Cloudy.	Per Cent of Cloudiness.[b]	Rain and Melted Show,—Inches.
Year	96	0	96	49.13	81	3.87	2.8	S. W. 225 N. W. 221	52	160	67	55	35.18
Jan.	19 46	7 0	46	26.74	90	1.85	2.7	N. W. 26 S. W. 20	9	19	5	71	1.80
Feb.	28 50	11 7	43	28.66	87	1.88	3.3	N. E. 25 S. W. 15	52	12	11	54	3.10
March	10 67	25 16	41	41.09	83	2.78	4.1	N. W. 28 S. W. 18	26	4	12	70	4.18
April	20 70	7 30	40	51.80	71	3.62	2.3	N. W. 23 N. E. 21	60	13	5	52	2.16
May	2 78	11 32	46	55.44	72	3.93	2.1	S. W. 17 S. E. 16 N. W. 16	67	11	3	46	1.94
June	30 91	6 36	55	65.50	74	5.25	2.3	N. W. 19 N. E. 19	72	15	2	37	4.22
July	17 96	24 50	46	73.51	78	7.08	2.7	N. W. 16 N. E. 10 S. W. 10	50	10	6	52	5.80
Aug.	8 88	27 47	41	70.99	78	6.52	2.3	S. W. 34 N. E. 13	86	19	1	33	1.46
Sept.	8 85	22 33	52	63.45	80	5.56	2.2	S. E. 25 N. W. 16	82	16	4	46	3.21
Oct.	1 80	27 25	55	51.66	77	3.72	2.5	S. W. 28 S. E. 24	60	14	8	49	1.66
Nov.	10 54	5 20	34	37.07	83	2.47	3.1	N. W. 23 S. W. 18	47	8	10	64	2.92
Dec.	9 41	22 4	37	23.66	94	1.72	4.1	S. W. 23 W. 18 N. E. 17	15	19	0	85	2.73

[a] By registering thermometers. The small figures above and at the right of the numbers stating the highest or the lowest temperature denote the day of the month on which the highest or the lowest temperature occurred.

[b] Average of observations, at 7 A. M., 2 P. M., and 9. P. M., daily.

[c] Average per cent of saturation.

[d] Average grains of vapor in a cubic foot of air.

[e] By 3 daily observations. The figures placed after the letters which state the prevailing directions denote the number of observations at which the wind was blowing from the direction stated.

39 and 40.* The level of the ground water in the year 1878 was unusually steady. As a correction to this statement it needs to be said that there is a constant though slow sinking of the level of the water in the earth in this section of the State; wells and streams are gradually failing.

41. The theory is held in some quarters, and it appears to be making converts, that the vehicle of typhoid fever poison is never the atmosphere, but *always* the drinking-water from contaminated wells and springs. The following series of three cases is reported as apropos to this question. They were children in one family, Alice, Mary, and Frank, aged respectively 18, 16, and 7 years. The cases occurred in the order of their ages. At the time of Alice's attack she was working in Lapeer City, where there had been recent cases of typhoid; Mary, in a country neighborhood, 40 miles

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

away, where there was none. Alice was sent home to have her run of fever, of four weeks' duration. Mary came home to nurse her and to catch the fever of her, coming down with it two weeks after Alice's convalescence. Mary's fever run four weeks, too; and as her convalescence began, the boy Frank got his attack.

The drinking-water used by this family came from a running spring, and there was no fever in the neighborhood to contaminate it.

Theories may be harmless or even useful, and still be untrue; but the one alluded to above is not a case in point, for if not true it is pernicious by causing the neglect of precautions which would otherwise be taken. It has not in this case the look of truth; for it involves the improbable conclusion that there was typhoid poison in the spring for at least 10 weeks, that is to say, for the time between the first and third cases. It is more reasonable to believe that Alice contracted the disease at Lapeer, and that it was given by her to Mary, and by Mary to Frank in the house, than to hold that a spring of running water was contaminated with typhoid fever poison for so long a time. The fact that the boy escaped while the weather was warm and the house stood open night and day, and caught the disease when cold weather came on and the house was shut up, makes this opinion more probable.

In our present state of ignorance it is not prudent to reject entirely the doctrine of personal infection in typhoid fever, nor to insist too strenuously that the disease cannot be propagated except through the medium of drinking-water from contaminated wells and springs.

42. Under the head of practicable suggestions for the prevention of diseases, a word might be said on a point that, so far as I am aware, has not been noticed by the Board of Health, and one, too, that is eminently practicable: it is a plan for the prevention of malarious diseases.

It is conceded that malaria is the cause of two-thirds of the acute diseases of Michigan, and that nearly all of the chronic diseases that are not thus primarily caused are at least made worse by it. Since, then, malaria is the central figure among the enemies of public health, practicable suggestions for its restriction are of importance. Much has been written about drainage under this head. But not much on the point referred to. The suggestion is, to utilize, in malarious districts, the leaves of trees for a protection against sickness. It was known to Lancisi, the original authority on the subject, and has been noticed by observers since his day, that trees had a protective influence against the effects of malaria. Since the invisible agent travels with the wind, and the prevailing winds are westerly, the indication is, *to leave, in clearing, or to plant if the land is already cleared, a belt of trees to the westward of the house* to neutralize or absorb the malaria. Large trees ought not to be left, in clearing, on account of their liability to be blown down by high winds, and small ones should have their tops sawed off for the same reason. There should be underbrush among the trees thick enough to make an efficient filter for the air that supplies the ground floor of the house, and the trees should be high and thick enough to be equally efficient for the second story.

The principal objection that has been made to this plan is that in a hot summer day, when but little air is moving, it is stopped by such a belt of trees and bushes and the house made uncomfortable; but there are not, in our summers, many such days, and the inconvenience is more than balanced by the protection afforded against wind in the winter.

My own experience and observation warrant me in the belief that the plan is very efficacious against the invasion of bilious diseases.

Respectfully,

Thornville, Lapeer Co., Mich., August, 1879. JOHN S. CAULKINS.

SOUTH-WESTERN DIVISION OF THE STATE.*

REPLIES BY H. S. LAY, M. D., OF ALLEGAN, MICH.

1. Village of 3,000 inhabitants.
2. About 25.
3. Allegan township and village.

4 and 5. About the average.

6. Diphtheria.

7, 8, 9, 10, 11, 12, 13, 14. ———.

15. Diphtheria.—[See answer 18.]

16. Of diphtheria, 55; of typhoid fever, 1; of scarlet fever, 19; of whooping-cough, 8; of cerebro-spinal meningitis, 1.

* For counties included in each division, see Exhibit 1, page 153.

17. Small-pox, cholera, measles.
18. November, October, June, July, December, January, and August, diphtheria; October, June, and July, scarlet fever.
19. No.
20. ——.
21. No.
22, 23. ——.
24. Not to my knowledge.
25. None to any extent.
26. Nothing unusual.
27. Good.
28. No.
29. Yes.
30. The usual proportion.
31. Nothing unusual.
32. I am not prepared to make a statement.
33. I am not in possession of the facts.
34, 35, 36, 37, 38, 39, 40, 41, and 42. ——.

Allegan, Allegan Co., Mich., March 19, 1879. H. S. LAY, M. D.

REPLIES BY F. GOODWIN, M. D., OF CASSOPOLIS, MICH.

1.* Incorporated village, population 1,000.
2. Twenty-five.
3. Village of Cassopolis.
4 and 5. About two-thirds greater.
6. Diphtheria.
7. I can assign no cause.
8. Scarlet fever.
9. I can give no particular reason.
10. Diphtheria.
11. I cannot.
12 and 13. ——.
14. Diphtheria, unusually high rate of mortality occurring during the months of October, November, and December.
15. ——.
16. About fifty cases of diphtheria and two of typhoid fever.
17. None of the diseases mentioned in question 16 appeared, with the exception of diphtheria and typhoid fever.
18. *January:* Bronchitis and catarrhal fever.
February: Pneumonia, croup, and influenza.
March: Pneumonia and intermittent fever.
April: Intermittent fever and erysipelas.
May: Intermittent fever, light fevers of no particular type.
June: Intermittent fever.
July: Intermittent fever, cholera infantum, and dysentery.
August: Intermittent fever, dysentery, and diarrhea.
September: Intermittent fever, dysentery, and typhoid fever.
October: Intermittent fever, diphtheria, influenza, and bronchitis.
November: Pneumonia, diphtheria, and intermittent fever.
December: Diphtheria, influenza, and bronchitis.
19 and 20. No cases.
21. Cases of intermittent fever more severe.
22. None.
23. Not that I observed.
24. No.
25. Hog cholera during greater part of year.
26. Wheat badly troubled with smut.
27. Fair.
28. I do not know.
29. I think it was.
30 and 31. Do not know definitely.
32 and 33. I cannot state facts.

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. On pages 150-179 is a summary of the replies.

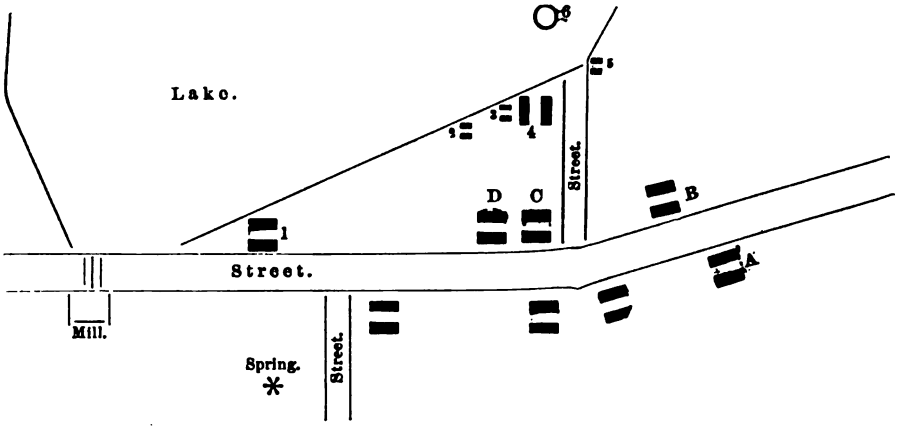
34. August and September.
35. May to July.
36, 37, and 38. ——.
39. June and July.
40. August to October.
41 and 42. I have nothing to communicate which would be of interest.

Cassopolis, Cass Co., Mich., June 30, 1879. F. GOODWIN, M. D.

REPLIES BY W. A. NEAL, M. D., OF DAYTON, MICH.

1. Village, population 300.*
2. Five, (5)—1 laryngeal phthisis, 1 railroad accident, 1 tubercular meningitis, 1 stillborn, 1 puerperal fever.
3. The village of Dayton and vicinity, a radius of five miles.
4. 10 per cent less.
5. Including accidents, about the same.
6. Scarlet fever and diphtheria.
7. I can assign none but contagion from other localities.
8. Consumption and dysentery.
9. Favorable climatic conditions, and improved sanitary conditions.
10. Diphtheria.
11. Malignancy of the type.
12. Bowel complaints.
13. Favorable climatic conditions.
14. Diphtheria in January, unusually high; dysentery and bowel complaints in July and August, unusually low.
15. Diphtheria in January, November, and December.
16. About 75 cases of diphtheria, and 8 or 10 of whooping-cough.
17. Small-pox, cholera, scarlet fever, typhoid fever, measles, and cerebro-spinal meningitis.
18. *January:* Bronchitis, diphtheria, pneumonia, rheumatism, and remittent fever
February: Bronchitis, pneumonia, diphtheria, and remittent fever.
March: Intermittent fever, remittent fever, bronchitis, rheumatism, and pneumonia.
April: Remittent fever, intermittent fever, and bronchitis.
May: Remittent fever, intermittent fever, and consumption.
June: Remittent fever and intermittent fever.
July: Remittent fever, intermittent fever, cholera-morbus, and diarrhea.
August: Remittent fever, diarrhea, dysentery, and intermittent fever.
September: Remittent fever, intermittent fever, rheumatism, diarrhea, and dysentery.
October: Intermittent fever, remittent fever, rheumatism, and diphtheria.
November: Intermittent fever, rheumatism, diphtheria, intermittent fever, and consumption.
December: Pneumonia, diphtheria, bronchitis, and rheumatism.
19, 20, 21, 22, 23. None here.
24. No.
25. None, except hog cholera (dysentery) in summer, and coughs (pleuro-pneumonia) in the fall and spring, both to a limited extent among hogs.
26. None.
27. Good.
28. No.
29. Yes.
30. None banked that was properly taken care of.
31. Less.
32 and 33. No data.
34. August and October.
35. May and November.
36. In wells that reach a vein of water the depth is uniform the year around; in those that reach into the clay only, and depend on surface-water seeping in, it will range from 10 feet in March, April, May, and November, to one or two feet or becoming dry in August.
37. Varies grearly, owing to the fissures in the clay; from 10 to 60 feet, average about 20 feet; springs are frequent, many of them large.
42. Isolation, sewerage, disinfection, cleanliness of cellars, as a protection against contagious diseases, as inculcated in the pamphlets and Reports of the State Board of Health. Drainage, the keeping of ponds and streams as nearly one level as possible,

better care and judgment in the care and location of privies, and the education of the people in sanitary matters. The utter carelessness and ignorance is well illustrated by the following cases. This place is on the border of a small lake fed by springs, the outlet furnishing water-power for a mill; barns and privies are built over the edges of the lake, as per diagram:



A, B, C, D, etc., represent houses with families living in them; 1 and 4, barns; 2, 3, and 5, privies; 6, a hole cut in the ice.

In December a family living in the house B used water from the hole in the ice. One young man had typhoid fever lasting four weeks, and came near dying. The father had typhoid fever two weeks; one son, malarial fever with typhoid symptoms; one son, diphtheria which proved fatal in less than 48 hours. In March a young girl of 15 was taken sick in house A with pneumonia. She was given water from the hole in the ice, and in one week typhoid fever developed itself, from which she died in another week.

Dayton, Berrien Co., July 18, 1879. W. A. NEAL.

REPLIES BY THOS. H. BRIGGS, M. D., OF MATTAWAN, MICH.

1.* Five hundred.
2. Five.
3. Townships, or portion of same, of Antwerp, Porter, and Almena, Van Buren Co., and Texas and Oshtemo, of Kalamazoo Co.
4. Less, twenty-five per cent.
5. About the same as the average.
6. First, cancerous diseases rapidly on the increase, chronic Bright's disease, diseases of the nervous system.
7. I am unable to do so.
8. All diseases influenced by malarial influences.
9. Dry soil throughout the major portion of the year.
11. I cannot.
16. Of scarlet fever, 25; of typhoid fever, 2; of diphtheria, 5; of typho-malarial fever, 8.
17. Small-pox, whooping-cough, cerebro-spinal meningitis.
24. Not observed to be.
25. None worthy of notice.
26. Potatoes were blighted from some cause unknown to me; but I think it may have been from the effects of the Colorado beetle and the use of arsenical and other poisons on the vines. This greatly interrupts the nutrition of the potato, the potatoes become diseased, and the use of them for food in this diseased condition largely adds to the development of cancerous conditions. We have a large amount of cancerous diseases in this part of Michigan, and I have not found a single case who has

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

not largely eaten of potatoes, and I can not help but believe that the diseased condition of our potatoes has something to do with the unusual prevalence of cancers.

27. Good.
28. No.
29. Yes.
30, 31. Less.
34. August, September, and October.
35. At no time.
36. Three feet.
37. All about alike, 25 feet.
39 and 40. At no time.
41. Cancerous diseases are increasing very rapidly, and I believe the potatoes have a great influence in their development. Potatoes in this portion of Michigan are in an unhealthy condition, brought into such diseased condition by the use of Paris green and other poisons for the destruction of the bug. This I believe to be worthy of close and careful investigation by our profession.

Truly yours,

Mattawan, Van Buren Co., Mich., Feb. 11, 1879. THOS. H. BRIGGS.

REPLIES BY SIMEON BELKNAP, M. D., OF NILES, MICH.

1.* Five thousand.
2. Fifty-seven. Accidental, 4; consumption, 14; cancer, 6; diphtheria, 7; scarlatina, 1; typhoid fever, 2. The number of deaths and causes of same I think are as accurate as possible to be made, although several of the deaths reported as from consumption were probably not tuberculosis but bronchitis or some chronic disease.
3. The city.
4. About an average.
5. About the same.
6. Consumption, or lung diseases.
7. I cannot.
8. Typhoid fever.
9. ——.
10. Consumption, or lung diseases.
11. I cannot.
12. Typhoid fever.
13. I cannot answer.
14. There was nothing marked in the variations.
15. ——.
16. Of small-pox and cholera, none; of scarlet fever, about 30; of typhoid fever, about 15; of measles and whooping-cough, none; of cerebro-spinal meningitis, 3; of diphtheria, (about 50, so called) probably not over 15 or 20 genuine cases, of which seven died.
17. Small-pox, cholera, measles, and whooping-cough.
18. *January:* Influenza, sore throat, pneumonia, intermittent fever, consumption, and diphtheria.
February: About the same as January.
March: Influenza, pneumonia, scarlatina, and consumption.
April: Influenza, pneumonia, and intermittent fever.
May: No prevailing diseases.
June: Bilious remittent fever, typhoid fever, and typho-malarial fever.
July: Typhoid fever, typho-malarial fever, remittent fever, and intermittent fever.
August: Dysentery, diarrhea, and same as in July.
September: Dysentery, diarrhea, and bilious remittent fevers.
October: Typho-malarial fever, and bilious remittent fever.
November: Typho-malarial fever, diphtheria, croup, and sore throat.
December: Bronchitis, diphtheria, croup, and sore throat.
19. No.
20. Our cases of bilious or typho-malarial fevers assumed a different type from anything I have previously seen, viz., irritable stomach with some vomiting of a yellow or dark yellow fluid, skin yellow or dingy, kidneys and bowels both disturbed, the former sluggish and the latter irritable, with small dark-colored evacuations, convalescence slow with a liability to a relapse or recurrence of the same class of symptoms, but no unusual mortality.
21. Nothing except what appears in answer to the question above.
22. No.

23. It was either epidemic or contagious, and I think contagious.
24. No.
25. Some cholera among hogs, but not as much as the year previous.
26. Nothing unusual,—wheat on sandy soil was injured by the fly.
27. Good.
28. No.
29. Yes.
30 and 31. No.
32. I cannot.
33. July and August.
34. July.
35. April.
36. Three feet to six feet.
37. Four feet to 60 feet, owing in part to distance and altitude from the river; and also in some parts there are springs or swampy districts.
38. I cannot.
39. April.
40. I do not think it was unusually less at any time.
41. I cannot.
42. ——.

The above report is given as accurate as is possible from statistics and observations.

Very respectfully,

Niles, Berrien Co., Mich., February 4, 1879. SIMEON BELKNAP.

REPLIES BY JAMES S. REEVES, M. D., OF NILES, MICH.

1.* City of Niles. City limits two miles square; population, 5,000.
2. ——.
3. City, and 4 miles adjacent to it.
4. Less.
5. Greater.
6. Old age, leukæmia, apoplexy, carcinoma, chronic metritis, and consumption.
7. I cannot assign a cause.
8. Eruptive fevers, malarious fevers, and unfavorable weather.
9. The absence of epidemic and malarious influences; favorable weather.
10. Apoplexy, consumption, carcinoma, chronic metritis, chronic gastro-duodenitis, and asthma.
11. I cannot assign a cause.
12, 13, 14, 15. ——.
16. There were some cases of scarlet fever in the spring of 1878; but I cannot give the number.
17. Small-pox, cholera, typhoid fever, measles, whooping-cough, cerebro-spinal meningitis, and diphtheria.
18. *January:* Rheumatism, intermittent fever, remittent fever, pneumonia, membranous croup, bronchitis, and consumption.
February: Rheumatism, pneumonia, bronchitis, consumption, remittent fever, intermittent fever, diarrhea, and dysentery.
March: Rheumatism, pneumonia, bronchitis, intermittent fever, remittent fever, consumption, diarrhea, influenza, croup, and scarlet fever.
April: Influenza, pneumonia, bronchitis, consumption, rheumatism, intermittent fever, and remittent fever.
May: Consumption, pneumonia, rheumatism, influenza, intermittent fever, diarrhea, and bronchitis.
June: Intermittent fever, rheumatism, bronchitis, consumption, croup (spasmodic), pneumonia, influenza, typho-malarial fever.
July: Intermittent fever, rheumatism, remittent fever, consumption, diarrhea, typho-malarial fever, influenza, pneumonia, bronchitis, and cholera morbus.
August: Intermittent fever, remittent fever, rheumatism, diarrhea, consumption, bronchitis, gastritis, gastralgia, tonsilitis, cholera morbus, erysipelas, and roseola.
September: Remittent fever, intermittent fever, typho-malarial fever, rheumatism, cholera morbus, consumption, influenza, dysentery, erysipelas, laryngitis, tonsilitis, gastritis, cystitis, bronchitis, diarrhea, dysentery, pharyngitis, and neuralgia.

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. On pages 150-179 is printed a summary of the replies.

October: Remittent fever, intermittent fever, typho-malarial fever, influenza, rheumatism, tonsilitis, laryngitis, bronchitis, consumption, diarrhea, dysentery, erysipelas, typhoid fever (enteric), and gastritis.

November: Intermittent fever, remittent fever, typho-malarial fever, typhoid fever (enteric), rheumatism, tonsilitis, bronchitis, consumption, diarrhea, erysipelas, influenza, laryngitis, and pharyngitis.

December: Tonsilitis, pharyngitis, laryngitis, bronchitis, influenza, consumption, pneumonia, membranous croup, diarrhea, intermittent fever, remittent fever, typho-malarial fever, and rheumatism.

19. No.

20, 21, 22. The fevers were all of a mild character, and terminated favorably; but in all the cases I met with there was an extremely irritable condition of the stomach. In three cases there was acute gastritis. In a number of cases the stomach gave but little trouble until the fever was about to subside, or had subsided, when it ceased to be retentive, and rejected almost everything that was swallowed. Small portions of ice would sometimes be retained. Grumous blood appeared in the matter ejected from the stomach in three cases. During the entire period of convalescence gastralgia resulted from the least imprudence in diet, in nearly all the cases I met with.

23 and 24. No.

25. There was some complaint of hog cholera in some parts of our county. I do not know at what particular time, or to what extent it prevailed.

26. The Colorado beetle destroyed some potatoes; other crops were unusually good.

27. Good.

28. No.

29. Yes.

30. No.

31. Less, scarcely any at all.

32, 33, 34, and 35. ——.

36. About 6 feet.

37. In West Niles, 40 feet; in East Niles it will vary from three to eighteen feet.

38. In June, July, and August, 1873, the depth of earth above the ground water was about 43 feet in West Niles; the balance of the year, 40 feet. I cannot answer for East Niles.

39, 40, 41, and 42. ——.

Respectfully,

Niles, Berrien Co., Mich., June 30, 1879. JAMES S. REEVES, M. D.

REPLIES BY MILTON CHASE, M. D., OF OTSEGO, MICH.

1.* I live in the incorporated village of Otsego, Allegan county, State of Michigan. The population was about 800.

2. Deaths from all causes in the village were 13.

3. Otsego village and Otsego township, parts of the townships of Watson and Trowbridge in Allegan county, and part of the township of Alamo in Kalamazoo county, except where I may designate our village.

4. Less than the average and less than last year. I should think twenty per cent less than the average for ten years past.

5. Somewhat less.

6. None.

8. Typho- malarial fever, epidemic diseases, and remittent fevers.

9. People have exerted themselves very much more to prevent the spread of epidemic diseases, and hard times have forced a plainer and better living upon the people.

10. None.

12. What little scarlet fever we have had has been light; so with the measles. Bilious remitting fevers were light. I think our lessened mortality arose from the character of these diseases.

13. I have no theory for the above diseases being milder than usual.

14. I think that our mortality from the sicknesses of August, September, and October was less than usual because the diseases ran light. I cannot give any causes under the control of man that accounts for lessened severity in these diseases. I do not keep a meteorological record, which might have helped to frame a theory for this.

15. No new visitants.

16. In the village, of scarlet fever, 1; of measles, 2. In the township, of scarlet

fever, 3; of diphtheria, 1. Rumor says that Dr. —— claims that he had several cases of diphtheria in the town and village; but he will not report them.

17. Small-pox, cholera, typhoid fever, whooping-cough, and cerebro-spinal meningitis.

18. *March* and *April:* Scarlet fever.
August: Measles.
September: Diphtheria.

19 and 20. None.

21, 22, 23. No.

24. I think not.

25. I think there has been but little, and this usually attributable to man's carelessness.

26. Corn was very smutty.

27. Good.

28. Only corn.

29. Yes.

30. Our millers and elevators were careful about storing grain before it had sweat; and they have taught the farmers to let it lie in the straw until the sweat is over.

31. Usually well secured.

32. January, February, and March were unusually warm and rainy; November and December, unusual in their steady cold, and amount of snowing days and cloudy skies.

33, 34, 35, and 36. ——.

37. In the village, about 16 feet; in the town, from 6 to 100 feet; in south center, from 6 to 12 feet; in northwest, from 60 to 100 feet; in the rest of the town, about 25 feet.

38. ——.

39. February, March, and April.

40. November and December.

41. None.

42. The health officer ought to have more power to enforce rules of State Board of Health and hygienic laws. He ought to be appointed by the Governor on a nomination by the Secretary of the State Board of Health.

Respectfully yours,

Otsego, Allegan Co., Mich., Jan. 28, 1878. DR. MILTON CHASE,
Health Officer of Otsego Village and Otsego Township.

REPLIES BY R. F. STRATTON, M. D., OF ST. JOSEPH, MICH.

1.* I estimate the number of inhabitants in this township, including the incorporated village, at 3,500.

2. Thirty-nine.

3. Township of St. Joseph, 8 sections of land.

4. About the same.

5. Greater, 1.48 to the 1,000 greater.

6. Those diseases peculiar to old age.

7. People have grown old with the country.

8. Consumption and contagious diseases.

9. There was less consumption, because of the previous mild winter.

10. Diseases peculiar to old age.

12. Consumption and malarious diseases.

13. To the mild winter, as in "9." There is less malaria every year, as the surface soil is more generally cleared and plowed, and the low lands drained.

14. There was a low rate of mortality from remittent fever, diarrhea, dysentery and cholera morbus.

15. There were none.

16. There were 15 cases of scarlet fever, and about 6 cases of diphtheria.

17. Small-pox, cholera, typhoid fever, and cerebro-spinal meningitis.

18. *January:* Bronchitis, remittent fever, and intermittent fever.
February: Bronchitis, influenza, and consumption.
March: Consumption, remittent fever, and rheumatism.
April: Consumption, rheumatism, bronchitis, and typho-malarial fever.
May: Consumption, intermittent fever, rheumatism, and diphtheria.
June: Whooping-cough, scarlet fever, remittent fever, and diphtheria.

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*The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

July: Intermittent fever and remittent fever.
August: Intermittent fever, remittent fever, diarrhea, dysentery, and cholera morbus.
September: Intermittent fever, remittent fever, diarrhea, and dysentery.
October: Intermittent fever, remittent fever, consumption, and scarlet fever.
November: Intermittent fever, remittent fever, consumption, scarlet fever, and rheumatism.
December: Bronchitis, tonsilitis, diphtheria, and rheumatism.

19, 21, 22, 23, 24, and 25. No.
26. Nothing in particular.
27. Wheat injured by a wet harvest.
28. No.
29 Yes.
30. ———.
31. No.
37. Generally, except after rainfalls, the surface water is 6 to 18 inches below the surface. Water in wells 3 to 6 feet below the surface. There is but little variation in this.
42. Nothing has done and is to do this county so much good as drainage. When land is well drained surface water is drawn off, surface moisture reduced to the minimum, and the decay of rank vegetation avoided. When, in addition, such land is placed under the plow, or even mowed or fed down by stock, then it will cease to contribute to the malarial diseases of the neighborhood. We have many streams in this county, formerly dammed for mill purposes, but now abandoned. Such dams still hold back a good deal of water, and these old ponds are full of decaying logs and sawdust. All such ponds fill their vicinage with intermittents, remittents, and bowel complaints among children during the warm months. Let boards of health do their duty. Very respectfully,

St. Joseph, Berrien Co., Mich., March 3, 1879. R. F. STRATTON, M. D.

SOUTHERN-CENTRAL DIVISION OF THE STATE.*

REPLIES BY ROBERT STEPHENSON, M. D., OF ADRIAN, MICH.

1. About eight (8) thousand.
2. 140.
3. City of Adrian.
4 and 5. About the same as the average.
6. None.
16. Of the diseases mentioned, there were more cases of scarlet fever, whooping-cough, and diphtheria than of the others; a few cases of typhoid fever and cerebro-spinal meningitis.
17. Small-pox, cholera, and measles.
19. and 24. No.
26. None.
28. No.
29. Yes.
31. Same as usual. Respectfully yours,

Adrian, Lenawee Co., Mich., May, 1879. R. STEPHENSON.

REPLIES BY E. N. PALMER, M. D., OF BROOKLYN, MICH.

1. Village. Number of inhabitants, 527.
2. Eight deaths: from diabetes, 1; from consumption, 1; from diphtheria, 6.
3. Columbia, Woodstock, Norvell, and Cambridge townships.
4 and 5. Less (estimated).
6. Diphtheria.
7. Opinion only:—There were only 12 rainy days during the months of July, August, September, and October. The temperature ranged from 104° in July, 95° in August, 88° in September, 81° in October. This excessive dry and hot weather reduced people from a normal state of health to a state fit to take on any low type of disease; consequently, when they were exposed, the usual result was sure to follow. I can best illustrate my idea in this way: If a person should sow his wheat on a barn floor, provided it was perfectly clean, he might apply moisture, sunshine, and heat continually and still would fail of a crop; but if he should drop the same seed in soil fully prepared, with all the conditions favorable, a full crop would be sure to follow. So with diseases, especially those of a contagious character; the soil, etc., must be in a proper condition for them to bring forth fruitage.

* For counties included in each division, see Exhibit 1, page 153.

10. See answer 7.
11. Unsanitary conditions. See, also, answer 7.
14. Diphtheria, from July 20 to December 10, 1878; the mortality was high.
16. Of scarlet fever, 6 or 8 (opinion); of whooping-cough, 50; diphtheria, from 125 to 150.
17. Small-pox, cholera, typhoid fever, measles, and cerebro-spinal meningitis.
18. *January:* Remittent fever, pneumonia, and scarlet fever.
February: Rheumatism and bronchitis.
March: Bronchitis, pneumonia, intermittent fever, and diphtheria.
April: Intermittent fever, bronchitis, pneumonia, and rheumatism.
May: Intermittent fever, remittent fever, and diarrhea.
June: Intermittent fever, remittent fever, and rheumatism.
July: Intermittent fever, diphtheria, rheumatism, remittent fever, and pneumonia.
August: Intermittent fever, tonsilitis, diphtheria, remittent fever, bronchitis, rheumatism, and puerperal fever.
September: Intermittent fever, diarrhea, remittent fever, rheumatism, cholera infantum, and typho-malarial fever.
October: Diphtheria, intermittent fever, bronchitis, whooping-cough, remittent fever, rheumatism, and dysentery.
November: Diphtheria, whooping-cough, intermittent fever, and pneumonia.
December: Whooping-cough, diphtheria, rheumatism, and pneumonia.
19. There has not.
20. There have been no cases of fever that have in any way simulated yellow fever.
21. I did not.
22. In our epidemic of diphtheria there was black vomit and vomiting of blood.
23. ——.
24. It was not, in my opinion.
25. There was no disease prevailing among animals.
26. There was none.
27. Condition good but light in weight.
28. No.
29, 30, and 31. Less.

32. *SUMMARY, for the Year 1878, of certain Meteorological Conditions at Brooklyn, Jackson Co., Michigan.*

Year and Months, 1878.	Temperature,—Degrees Fahr.				Days.				Prevailing Winds,—Days.							
	Extremes.		Average.													
	Highest.	Lowest.	Morn.	Noon.	Clear.	Cloudy.	Rainy.	Snowy.	N. W.	N.	N. E.	E.	S. E.	S.	S. W.	W.
Year*...	107	0	44.71	57.03	186	127	36	16	85	11	28	27	58	14	76	66
Jan.	45	1	24.45	31.80	8	18	0	5	9	1	0	2	7	0	9	3
Feb.	50	10	22.00	38.00	11	13	0	4	11	2	6	3	3	0	2	1
Mar.	71	20	36.00	46.50	10	16	4	1	9	1	3	1	8	2	6	1
Apr.	77	30	48.25	62.50	16	9	5	0	5	2	0	7	7	0	2	7
May	82	34	51.00	66.50	22	6	3	0	4	0	2	3	5	1	9	7
June	100	45	52.25	72.50	17	6	7	0	4	0	1	4	3	2	7	9
July	107	55	68.25	88.00	21	7	3	0	9	2	5	0	7	1	3	4
Aug.	95	42	67.50	75.75	21	7	3	0	7	1	5	0	3	0	8	7
Sept.	88	45	54.75	70.50	21	6	3	0	7	1	3	0	7	2	8	2
Oct.	81	28	43.35	50.04	18	10	3	0	9	0	0	0	3	2	11	6
Nov.	60	20	36.75	43.12	16	8	5	1	6	1	1	6	2	1	4	9
Dec.	48	0	32.00	39.10	5	21	0	5	5	0	2	1	3	3	7	10

* This line has been added, in the office of the Secretary of the Board, to the table prepared by Palmer.

33, 34. The months of June, July, August, and September were unusually dry; but I cannot give any particular data.

36. There was not much variation in the depth, except during the 4 months commencing with June; water averaged 6 feet until September, when many of the wells were dry.

37. From 16 feet to 75 feet.

38 and 39. Have kept no data.

40. September, October, and November.

All of which is respectfully submitted. In regard to meteorological report, I would say that it is the best I can do with the means at my command.

Brooklyn, Jackson Co., Mich., March 4, 1879. E. N. PALMER,
Health Officer of the Township of Columbia.

REPLIES BY J. W. FALLEY, M. D., OF HILLSDALE, MICH.

1.* City, 4,500,—growing less.

2. From the undertaker's books and sexton's books, 60.

3. City of Hillsdale and very near around.

4. I think greater.

5. I think a little greater.

6. In the last two years scarlatina and diphtheria, I think, have caused nearly or quite half the deaths; I think less in 1878 than in 1877. More fevers and bilious troubles last year than usual, not many deaths.

7. I cannot for diphtheria and scarlatina; of the fevers and bilious troubles, the wet spring and early part of summer, and very hot weather. The malignity of scarlet fever and diphtheria almost ceased as the bilious troubles commenced.

8. All others were less prevalent, that is, diarrheas, dysenteries, etc., almost none except as connected with the bilious derangement; no epidemic.

9. ——.

10. Scarlatina and diphtheria.

11. I cannot. More fatal in cold or cool weather than in warm weather.

12. I can think of no death in the city or near by from puerperal fever, or childbirth. Fact is there has been a dearth of children the past year; in fact almost all the deaths have been children or quite young or quite old persons.

13. I cannot.

14. All bilious troubles, dysenteries, and as answered in "6" and "7." The mortality from fevers and bilious troubles was not high for the amount of sickness; the death-rate from scarlatina and diphtheria was rather high in the winter and spring. Scarlatina and diphtheria have hung over this place for several years, breaking out, now here and now there, without any apparent cause; then only isolated cases, or perhaps none at all for some weeks. Since last spring there have been few cases and lighter.

15. Not any.

16. I cannot. Some cases of scarlet fever and diphtheria; very few cases of typhoid fever. I think the typhoid pneumonia more than pure typhoid fever. Few and light measles and whooping-cough; I think two cases of spinal-meningitis. No epidemic, endemic, or infectious diseases, except those mentioned.

17. Small-pox and cholera.

18. *January*, *February*, *March*, and *April:* Scarlatina and diphtheria, pleurisy and pneumonia.
May, *June*, and *July:* Quite healthy.
August, *September*, and *October:* Rather more than usual fall fevers and an uncommon aguishness ever since August, even during this winter.
November and *December:* Quite healthy, except the above aguish tendencies.

19. None.

20. None.

21. I did not.

22, 23. ——.

24. I think not.

25. Answered in "18."

26. Very little of either.

27. Nothing particular except in wheat. The crop was good, but millers say it will not make "first quality flour." The warm, wet weather rushed it forward so fast, then when about ripe it was so hot and dry the hull became so thick, dry, and hard that the kernel never dried through, but remained soft.

28. No, not to any extent.

29. It would not dry out well. See 27.

30. Not much of that trouble with farmers, some in warehouses.
31. Early cut was injured.
32. I have not the facts to do so.
33. Winter quite dry. May, June, and first part of July very wet. More rainy days in May and June than dry; two-thirds of July, all of August, September, and first half of October, very dry. Little snow or rain during the winter. In fact, our gravelly and sandy opening land has hardly been wet down two feet for years.
34. We have had dry summers for years, some more than others.
35. For three years May and June have been very wet. From much of our land the water flows off very freely.
36. Most of the wells in this city are from 35 feet to 60 feet deep. These are not easily affected, and seldom vary much.
37. On the flats along the St. Joseph's River, about 20 feet; water not very good. If they can reach a gravel bed 30 or 35 feet it is good. On the higher grounds the wells will average 35 feet, yes, more are 40 feet; a very few 60 and 80 feet. On the timber land south of the city, average 30 feet. There the spring rains sometimes fill the wells nearly full.
38. In the city, except on the flats, we get no surface water, or "ground water." In the timber land a few feet in a wet time.
39. May and June.
40. September, October, November, and December.
41. I could give many, in scarlatina and diphtheria; but that is now so well understood. I will give one case. Last winter a girl 15 years old came home, with a sore throat, pretty sore; she was not confined to bed. There was no scarlatina in that part of the city. In about 8 days three children, aged about 10, 8, and 6, were taken down (in the same family) with the most malignant scarlatina. One died; the others recovered after going through all the sequela that can follow scarlatina. A brother and sister, aged 18 and 20, had all the symptoms except the rash. Some 30 cases followed right along in that neighborhood, all the same types, and followed more or less by the same symptoms; some died, one a young woman of thirty years. At the time of death she was the color of a boiled lobster.

With high esteem,

Hillsdale, Hillsdale Co., Mich., July 6, 1879. J. W. FALLEY.

REPLIES BY A. R. SMART, M. D., OF HUDSON, MICH.

1.* 3,000.
2. 30.
3. A radius of 4 miles from Hudson.
3. A little greater, perhaps.
5. About the same.
6. Intermittents were rather more prevalent.
7. I know no cause.
8. Less scarlatina, diphtheria, and typhoids.
9. I do not know.
10. None.
11, 12, 13. ——.
14. None.
15. We have had none.
16. Of scarlet fever, perhaps 6 cases; of typhoid fever and typho-malarial fever, perhaps 20 cases.
17. Small-pox, cholera, measles, cerebro-spinal meningitis, and diphtheria.
18. I cannot, from memory.
19. No cases.
21. No.
24. Yes, I think so.
25. Some among hogs during the fall months, thought to be hog cholera.
26. None to any extent, although apples have rotted unusually.
27. Good.
28. Not that I am aware of.
29. I think so.
30. Less, I think.
31. Less so.
32. I cannot.
33. Most moisture during spring and fall months.

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

34. About an average.
36. 2 feet to 6 feet.
37. In some, 10 feet; in others, 20 feet to 25 feet.
38. I cannot tell.
39. March and April.
40. Not unusually low.
41. ———.

Respectfully yours,

Hudson, Lenawee Co., Mich., March, 1879. A. R. SMART, M. D.

REPLIES BY W. WORSFOLD, M. D., OF JACKSON, MICH.

1. About 20,000.
2. Interments in general cemetery, "Greenwood," in 1878, 165; interments in Roman Catholic Cemetery, 55; total, 220. Allowing the number taken out of city for interment to counterbalance the number brought in, the above will afford a pretty close enumeration.
3. Replies relate to all within city limits.
4. Should estimate sickness at about one-third of usual amount; that is, taking a like period some 3 or 4 years back.
5. Deaths were less numerous.
6. Diphtheria and whooping-cough were the only diseases that were more than usually prevalent during 1878.
8. Zymotic diseases generally were less than usually prevalent; there were no epidemics of any except diphtheria.
9. I do not know that their lessened prevalence can be accounted for in any definite way.
10. There was no unusual mortality from any disease.
12. Zymotic diseases generally, except diphtheria and whooping-cough.
13. ———.
15. None.
16. Cannot arrive at the number of any of these diseases.
17. Small-pox, cholera, cerebro-spinal meningitis; of the last-named disease there may have been some reported, but I do not think there was a true case.
18. *March:* Bronchitis, influenza, laryngitis, pneumonia, tonsilitis, rheumatism, consumption, diphtheria, and mild remittent fever.
April: Bronchitis, influenza, remittent fever, pneumonia, consumption, rheumatism, tonsilitis, and intermittent fever.
May: Same as April, with increased amount of bronchial affections.
June: Remittent fever, intermittent fever, bronchitis, influenza, consumption, and whooping-cough.
July: Remittent fever, intermittent fever, diarrhea, consumption, whooping-cough, and bronchitis.
August: Remittent fever, diarrhea, cholera morbus, intermittent fever, consumption, whooping-cough, cholera infantum, pneumonia, and bronchitis.
September: Whooping-cough, remittent fever, bronchitis, intermittent fever, consumption, influenza, and typho-malarial fever.
October: Remittent fever, whooping-cough, intermittent fever, bronchitis, consumption, diphtheria, and typho-malarial fever.
November: Bronchitis, influenza, whooping-cough, remittent fever, diphtheria, consumption, rheumatism, and typho-malarial fever.
December: Bronchitis, influenza, rheumatism, diphtheria, pneumonia, whooping-cough, consumption, tonsilitis, and scarlatina.
19. None.
20, 21, 22, and 23. Nothing of this sort occurred,
24. I did not meet with any increase of dyspeptic troubles during January, February, and March.
25. I am not cognizant of any disease amongst animals during 1878.
27. All cereals were of excellent quality in this locality; wheat was especially good.
28. There was no unusual growth of fungi amongst these grains.
29. Yes.
30. There was no complaint of wheat "banking."
31. Hay was good, and preserved in good order.
32, 33, 34, 35, 36, and 42. I have no data.

Yours respectfully,

Jackson, Jackson Co., Mich., April 21, 1879. W. WORSFOLD.

REPLIES BY W. B. SOUTHARD, M. D., OF KALAMAZOO, MICH.

1.* Incorporated village, population about 12,000.
2. 165, not including those from the State asylum for the insane.
3. Kalamazoo township.
4. Somewhat less.
5. Less, I should say 10 per cent.
6. Not any.
8. Dysentery, typhoid fever, and diphtheria.
9. I believe it to be, to some extent, due to the increased use of Holly water in the more densely populated portions of our village.
10. There was none that I am aware of.
12. Dysentery, typhoid fever, and diphtheria.
13. Same as answer "9."
14. Diphtheria, scarlet fever, and whooping-cough have been, as a rule, very mild.
15. I do not know of any.
16. Am unable to give number of cases.
17. Small-pox, cholera.
18. *January:* Intermittent fever, remittent fever, influenza, typho-malarial fever, diphtheria, scarlatina, and consumption.
February: Intermittent fever, remittent fever, influenza, diphtheria, scarlatina, consumption, and bronchitis.
March: Influenza, intermittent fever, diphtheria, bronchitis, pneumonia, whooping-cough, and consumption.
April: Influenza, intermittent fever, diphtheria, bronchitis, pneumonia, whooping-cough, rheumatism, and consumption.
May: Intermittent fever, whooping-cough, and consumption.
June: Intermittent fever, diphtheria, consumption, and diarrhea.
July: Intermittent fever, diphtheria, diarrhea, whooping-cough, and consumption.
August: Intermittent fever, remittent fever, diarrhea, whooping-cough, diphtheria, cholera infantum, and consumption.
September: Intermittent fever, remittent fever, diarrhea, whooping-cough, typho-malarial fever, diphtheria, and consumption.
October: Intermittent fever, remittent fever, whooping-cough, typho-malarial fever, diphtheria, consumption, and tonsilitis.
November: Intermittent fever, remittent fever, whooping-cough, diphtheria, tonsilitis, bronchitis, consumption, and croup.
December: Intermittent fever, influenza, remittent fever, tonsilitis, whooping-cough, bronchitis, rheumatism, diphtheria, croup, and consumption.
19 and 21. No.
24. Not to attract attention.
25. No prevailing disease.
26. None.
27. Excellent.
29. Yes.
30, 31. Less.
32. I am unable to do so.
37. In the valley 10 feet to 20 feet; on the prairies and table lands 50 feet to 100 feet.

The remaining questions I am unable to answer with any degree of accuracy, having no data.

Very respectfully,
Kalamazoo, Kalamazoo Co., Mich., Feb. 13, 1879. W. B. SOUTHARD, M. D.

REPLIES BY H. C. CLAPP, M. D., OF MENDON, MICH.

1.* About 1,000.
3. The village of Mendon, with a radius of six miles.
4. About the same as the average of previous years.
5. About the same as the average.
6. None.
8. None, excepting malarial diseases, which have been less prevalent during the past four or five years; but about the same during 1878 as during that period.
9. To the drainage of marshes and low lands.

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

10 and 12. None.

15. Three cases of typhoid fever in one house on February 15, March 13 and 16,—one fatal; cause, contamination of well from privy-vault. Two cases of scarlet fever occurring in different localities on February 22 and November 23.

16. Two cases of scarlet fever; about forty of whooping-cough, as near as could be determined; and three of typhoid fever.

17. Small-pox, cholera, measles, cerebro-spinal meningitis, and diphtheria.

18. *January:* Bronchitis, rheumatism, intermittent fever, remittent fever, and typho-malarial fever.

February: Pneumonia, bronchitis, intermittent fever, remittent fever, and rheumatism.

March: Intermittent fever, remittent fever, bronchitis, pneumonia, and rheumatism.

April and *May:* The same as March.

June: Bronchitis, intermittent fever, remittent fever, pneumonia, and rheumatism.

July: Intermittent fever, remittent fever, rheumatism, pneumonia, and typho-malarial fever.

August and *September:* Intermittent fever, remittent fever, bronchitis, hepatitis, and diarrhea.

October: Intermittent fever, remittent fever, bronchitis, hepatitis, jaundice, and whooping-cough.

November: Intermittent fever, remittent fever, bronchitis, whooping-cough, rheumatism, hepatitis, pneumonia, and pleurisy.

December: Whooping-cough, bronchitis, pneumonia, intermittent fever, remittent fever, rheumatism, tonsilitis, croup, influenza, and neuralgia.

NOTE.—We have from three to a half dozen consumptives all the time, and about the same number of cancerous affections.

19. No.

21. None, excepting what was diagnosed as jaundice, one of which died, in which there was no "black vomit" or evidence of contagion.

24. No.

25. A little cholera among hens during May and June.

26. Usually good. We had a very wet harvest and some pieces of wheat were a little grown.

27. Good, except what little wheat was grown.

28. No.

29. Yes.

30. Usual proportion.

31. Less.

32. I have no data.

33. October, September, August, January, March, May, June, December, November, February, April, and July.

34. October, September, August, and January.

35. July, April, and February.

36. No data.

37. Varies in different parts of the village, about two feet, the average between 15 and 17 feet.

38. No data.

39. February, April, and July.

40. January, September, and October.

Respectfully submitted,

Mendon, St. Joseph Co., Mich., February 3, 1879. H. C. CLAPP.

REPLIES BY NELSON I. PACKARD, M. D., OF STURGIS, MICH.

1.* Village, population about 2,400.

2. About 12, not over 15.

3. Village and township of Sturgis.

4. About the average for 5 years last past.

6, 8, 10, 14. None.

16. A few cases of whooping-cough, perhaps 20.

17. Small-pox, cholera, scarlet fever, typhoid fever, measles, cerebro-spinal meningitis, and diphtheria.

18. *January:* Bronchitis, pneumonia, consumption, remittent fever, intermittent fever, croup, 1 case of puerperal fever.

February: Pneumonia, bronchitis, consumption, intermittent fever, remittent fever, erysipelas, croup.

March: Bronchitis, pneumonia, intermittent fever, remittent fever, consumption, rheumatism.
April: Bronchitis, intermittent fever, remittent fever, consumption, croup.
May: Intermittent fever and consumption.
June: Intermittent fever and consumption.
July: Intermittent fever, remittent fever, diarrhea, and consumption.
August: Diarrhea, intermittent fever, remittent fever, consumption, dysentery, and cholera infantum.
September: Influenza, remittent fever, intermittent fever, diarrhea, dysentery, and consumption.
October: Intermittent fever, remittent fever, influenza, diarrhea, whooping-cough, and consumption.
November: Intermittent fever, remittent fever, influenza, diarrhea, whooping-cough, pneumonia, bronchitis, consumption, neuralgia, and tonsilitis.
December: Pneumonia, bronchitis, intermittent fever, remittent fever, consumption, and tonsilitis.

19. No cases.
21 and 24. No.
25. Hog cholera and chicken cholera, to a limited extent, in autumn and winter months.
26. Smut to slight extent in wheat.
27. In good order.
28. Smut in wheat to slight extent.
29. Yes.
30. Less.
31. In fair average order.
32. No record kept.
37. 40 feet+.
38. No material change from month to month or yearly.

Respectfully,
Sturgis, St. Joseph Co., Mich., March 1, 1879. NELSON I. PACKARD, M. D.

REPLIES BY C. W. BACKUS, M. D., OF THREE RIVERS, MICH.

1.* Incorporated village of Three Rivers, population about 3,000.
2. Deaths, 27; 9 per 1,000 population.
3. Village of Three Rivers.
4. Less,—probably 25 per cent less; I cannot give any accurate estimate.
5. Less,—probably 1½ or 2 per 1,000 less than last or previous years.
6. Consumption, diphtheria, and scarlet fever.
7. We have had no cases of diptheria or scarlet fever, previously to 1878, for several years. I could not find any local cause, the diseases being imported from other towns.
8. Malarial.
9. To dry soil in the fall, and draining of marshes near the village.
10. Consumption, diphtheria, and scarlet fever.
11. None, specially.
13. Answered in "9."
14. Diphtheria in March and April, rate high; 4 cases and three deaths; consumption, in spring months, rate high.
15. Pseudo-membranous croup, in October and November; diphtheria, in March, April, and November; scarlet fever, in September, October, November, and December.
16. Of scarlet fever, 27; of cerebro-spinal meningitis, 1; of diphtheria 6. The above cases were reported. I think that about 12 cases of scarlet fever existed that were not reported.
17. Small-pox, cholera, typhoid fever, measles, and whooping-cough.
18. *January:* Dyspepsia, neuralgia, rheumatism, bronchitis, and diarrhea.
February: Dyspepsia, intermittent fever, bronchitis, rheumatism, and pneumonia.
March: Intermittent fever, neuralgia, pharyngitis, bronchitis, and dyspepsia.
April: Neuralgia, intermittent fever, bronchitis, pharyngitis, and rheumatism.
May: Intermittent fever, pharyngitis, bronchitis, and neuralgia.
June: Intermittent fever, bronchitis, influenza, and catarrh.

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. On pages 150-179 is printed a summary of the replies.

July: Intermittent fever, remittent fever, diarrhea, and influenza.
August: Intermittent fever, remittent fever, diarrhea, bronchitis, and influenza.
September: Intermittent fever, functional derangement of the liver, remittent fever, influenza, and bronchitis.
October: Intermittent fever, remittent fever, hepatic disorders, and influenza.
November: Intermittent fever, remittent fever, pharyngitis, and bronchitis.
December: Intermittent fever, pharyngitis, canker sore throat, bronchitis, and influenza.

19. None.
20. None. Several refugees from infected cities, but no trace of the disease.
21, 22, and 23. None.
24. Yes.
25. I am not aware that any special disease existed at any time; if so, it was not general.
26. Smut in wheat light; no injury therefrom.
27. Good; wheat grown some and shrunk from much rain during harvest time.
28. No.
29. Yes. Not much early threshing.
30. About the usual average.
31. No.
32. Warm in January and February; March and April, wet; May and June, dry; July and August, wet; September, October, and November, dry; December, wet.
33. May, June, August, September, October, January, March, April, July, February, November, and December.
34. August and September.
35. July and April.
36. Four to six feet; does not vary much.
37 and 38. I cannot give any estimate.
39. July and spring months.
40. Fall months and December.
42. Greater care should be used in disinfecting clothing where there exists any contagious disease. The first cases of diphtheria we have had in our village for 13 or 14 years were contracted from clothing in a trunk, taken out to be aired, by a lady who lost a child two months previously from diphtheria, and the cases resulting therefrom proved very fatal,—4 cases and three deaths.

Respectfully submitted,

Three Rivers, St. Joseph Co., Mich., Feb. 18, 1879. C. W. BACKUS.

REPLIES BY H. F. EWERS, M. D., OF UNION CITY, MICH.

1.* Union city, an incorporated village,—population 1,800.
2. Thirteen (13.)
3. Six miles square.
4. Less, 33⅓ per cent.
5. Less, 30 per cent.
6. Old age and consumption.
8. Miasmatic.
9. Less miasm and better hygienic conditions.
10. Consumption.
12. Continued fever.
13. Cases of mild type.
14. Low rate throughout the entire year from continued fever dependent on miasm and from diseases of zymotic origin.
15. None.
16. A few cases of whooping-cough.
17. None but whooping-cough.
19, 20, 21, 22, 23, and 24. No.
26. None.
27. Good.
28. No.
29. Yes.
30. Less; never in better condition.
31. Less.
37. Forty feet in the village; in the "oak openings" portion of township, 20 to 24 feet; in the "heavy timbered" portion, 10 to 20 feet.

Union City, Branch Co., Mich., March 1, 1879. H. F. EWERS, M. D.

REPLIES BY S. C. VAN ANTWERP, M. D., OF VICKSBURG, MICH.

1.* Incorporated village of Vicksburg; population, 1,150.

2. During the year there were 9 deaths. With the exception of one infant, the youngest was 18 years of age. Consumption was the cause of death in five cases. Of these five cases, all were women in middle life, except one, a young lady of 18. I never lived in a place where the mortality was so small among children. One case died of heart disease; one, of paralysis; and one, of old age.

3. Village of Vicksburg.

4 and 5. About the same.

6. Consumption.

8. Dysentery.

14. In diphtheria, which occurred early in the year, the mortality was small. This disease occurred mostly outside of the village, however, in the country. It did not assume an epidemic form.

15. An epidemic of influenza. It affected the respiratory organs, and was in some cases confined to the head, and sometimes to the lungs and bronchial tubes. It resembled in some respects the epidemic which occurred in 1872, called popularly the epizoötic.

16. Diphtheria was the only one on this list and, as stated before, it was mostly confined to the country outside of the village.

27. Good.

29. Yes.

30. No.

31. Good.

32. Generally dry.

33. Dry.

34. September and October.

35. April.

36. 14 to 16 inches.

37. Average 14 feet to 15 feet.

42. This village is in a very healthy location. Last year was quite dry, and we might have expected more intestinal disorders. There seem to be a great many dyspeptic cases. Our malarial atmosphere complicates most of our diseases, as we find in cases of headache pain taking the place of chill oftentimes, and fever following every other day. The query might be asked whether, if our malaria is similar to that in the East, certain kinds of trees, if introduced, might not aid in the absorption of this poison.

Respectfully yours,

Vicksburg, Kalamazoo Co., Mich., Aug. 4, 1879. S. C. VAN ANTWERP.

REPLIES BY EDWARD BATWELL, M. D., OF YPSILANTI, MICH.

1.* In this city we have a population of 6,000, which does not vary, except from the numbers attending the Normal School.

2. About 25.

3. City of Ypsilanti.

4. The first eight months of the year was remarkably free from deaths; but the last four months made it average about equal with former years.

5. About equal.

6. None.

7. Intermittent fevers prevailed, owing to the early vegetation, and moisture of the soil.

8. Small-pox.

10. 1878 seemed very fatal to patients with pulmonary consumption.

11. The humidity of the atmosphere seemed to influence it.

12. Small-pox.

13. Not having any.

14. None occurred.

15. We have our fair share of everything going.

16. My opinion is that over 50 cases of scarlet fever occurred during 1878; 40 of typhoid malarial; and a few cases of diphtheria. The others in this list did not occur at all.

19. Nothing of this sort occurred.

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* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

25 and 26. I heard of none.
27. All reported sound and good.
29. Yes.
30, 31. Less.
37. On the east side of the Huron river the depth of wells is from 40 feet to 60 feet; on the west side good springs can be struck at from 15 feet to 25 feet.
38. The amount of water in the wells of this city was very low in November.
39. In June the wells were unusually high.
41. The first case of scarlet fever that was reported in this city, originated in a family whose home was in the outskirts of the town, perfectly isolated, and fully one-fourth of a mile from any other dwelling. The children had not been away from the house for several weeks. Five of them were attacked *at the same time* with a severe form of scarlet fever. One of them died, and the others slowly recovered. The next case occurred in one of the children of our "best families," where three others were daily exposed to its influence, but no other cases happened in this house. The next case heard of was in the extreme end of the city, fully 1½ miles from the cases first reported, seven in one family; and five in the next house were down with scarlet fever at the same time. I could trace no contagion as the cause of its spreading, nor am I yet satisfied as to its necessity. The subject of closing the public schools was strenuously urged on the school board; but they very properly and judiciously thought that the children were not more exposed in the schools than they were playing together on the streets. I have yet to be convinced that the system of quarantine is productive of results sufficiently satisfactory to warrant its enforcement. If a family is shut up and unable to provide for themselves, as is too often the case, they must be furnished with the necessaries of life. In a community where scarlet fever exists to any extent the expense incurred by this proceeding would pauperize the taxpayer. In a neighboring city strict quarantine was enforced and the schools were closed; a panic was created, trade driven from the town, and with "very satisfactory results," as stated by the board of health. Notwithstanding, *the disease exists there at this present time* in as great proportions as where these precautions were not taken. I fully admit the contagiousness and infection of scarlet fever, the necessity existing for sanitary measures, and the necessary precautions required to prevent its increase; but I do deny that you can limit the spread of the disease by quarantine, as you can that of small-pox, or draw its ravages within a prescribed circle.

The answering of questions in circular 29 must, of necessity, be a matter of opinion.

Respectfully yours,

Ypsilanti, Washtenaw Co., Mich., March, 1879. EDWARD BATWELL, M. D., *Health Officer.*

SOUTH-EASTERN DIVISION OF THE STATE.*

REPLIES BY LEARTUS CONNOR, M. D., OF DETROIT, MICH.

1. 130,000.
2. No basis for estimate of much value as our mortuary records are very loosely kept. I think that there were about 2,200.
3. City of Detroit.
4. About the same as the three preceding years.
5. I do not think it varied much during the years since the panic in 1873.
6. None in any marked degree.
8. Epidemic diseases.
9. Better drainage.
16. No small-pox, cerebro-spinal meningitis, or cholera; of the other diseases, I can give no exact statement.
18. Is already answered by weekly reports.†
19. None.
21 and 24. No.
25. I cannot tell of any.
36. No wells.

Detroit, Wayne Co., Mich., Feb. 2, 1879. LEARTUS CONNOR.

* For counties included in each division, see Exhibit 1, page 153.
† Statements contained in Dr. Connor's weekly reports have been included in Exhibit 4, pages 162-3.

REPLIES BY W. H. ROUSE, M. D., OF DETROIT, MICH.

1.* I live in Detroit which contains an estimated population of 125,000. The State census of 1874 gave 101,245.

2. About 1,900. The subjoined table, compiled from the reports of the superintendents of the various cemeteries of the city, now on file in the office of the city clerk, furnishes the most reliable information, available at present, in regard to the number of deaths with their causes.

TABLE A.—*Exhibiting, for the City of Detroit, Michigan, by Months during the Year 1878, and for the Years 1877 and 1876, the number of Interments, and the reported Causes of Deaths, and also the Increase or Decrease from each Cause in 1878, as compiled from the reports made by the Superintendents of Cemeteries, to the City Clerk.*

DISEASES AND CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Totals.			In 1878 More (+), or Less (—), than in 1877.
													1878.	1877.	1876.	
All Causes	135	148	147	174	161	156	230	186	150	132	135	155	1,909	2,105	2,217	—196
Asthma	----	2	1	1	2	----	----	1	----	----	1	----	8	7	7	+1
Accident	2	2	3	3	1	4	1	3	5	1	3	1	29	24	49	+5
Asphyxia	----	1	----	1	1	----	----	----	----	----	----	----	3	4	4	—1
Abscess	2	2	----	2	----	1	----	2	1	1	2	----	13	6	2	+7
Apoplexy	1	1	2	4	2	1	5	1	4	3	2	6	32	22	9	+10
Aphthæ	----	----	----	1	----	----	2	----	----	----	----	----	3	1	2	+2
Albuminuria (Bright's)	1	----	1	----	1	----	1	1	2	2	1	----	10	8	21	+2
Brain, Disease of	----	----	1	----	----	----	2	1	2	2	1	----	9	1	0	+8
Inflammation of	----	1	----	6	1	3	2	2	1	2	1	----	19	25	45	—6
Meningitis of	1	3	4	2	5	3	5	1	----	1	1	2	28	38	12	—10
Tubercular Meningitis of	----	----	----	----	----	----	----	----	----	----	----	----	0	2	4	—2
Softening of	----	----	----	----	----	----	----	----	----	----	----	----	0	10	6	—10
Congestion of	1	----	2	----	2	1	5	1	3	----	----	1	16	34	41	—19
Water on (Hydrocephalus)	1	4	2	3	1	3	1	2	2	1	----	----	20	25	15	—5
Bronchitis	----	3	12	3	7	1	1	----	1	4	2	2	36	31	22	+5
Cancer	4	1	----	----	2	3	3	3	1	----	4	3	24	43	24	—19
Confinement, Child-Birth	----	----	----	----	----	1	3	----	----	----	----	----	4	6	9	—2
Congestion	----	----	----	----	----	2	----	1	----	3	----	----	6	13	20	—7
Convulsions, Cramps	8	17	5	3	8	9	21	13	12	12	12	14	131	173	176	—42
Croup	4	3	----	7	1	3	----	2	2	3	2	8	35	38	38	—3
Consumption	15	10	22	13	24	15	15	17	16	15	7	15	184	163	210	+21
Cholera Morbus	----	----	5	----	----	----	2	2	----	----	----	----	9	8	0	+1
Cholera Infantum	1	----	----	----	1	5	46	37	9	4	----	----	103	148	225	—45
Debility	----	----	----	1	3	3	6	7	5	5	5	9	44	49	79	—5
Diphtheria	7	6	3	2	3	----	1	1	6	5	5	8	47	54	30	—7
Diarrhea	----	----	----	2	----	----	9	4	2	3	3	----	23	27	46	—4

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

TABLE A.—CONTINUED.—*Interments in Detroit, in 1878, 1877, and 1876.*

DISEASES AND CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Totals. 1878.	1877.	1876.	In 1878 More (+), or Less (—), than in 1877.
Dysentery	....	....	1	....	....	1	....	....	1	....	....	1	4	13	20	—9
Dropsy	5	4	4	4	3	....	....	7	3	....	4	..	34	31	31	+3
Died at Birth	....	....	..	....	....	....	....	....	..	....	..	..	0	3	5	—3
Drowned	....	....	..	....	3	7	4	5	1	1	1	..	22	17	15	+5
Erysipelas	2	....	..	....	....	....	....	2	1	....	2	2	9	7	0	+2
Fever	1	....	..	....	1	1	....	0	1	1	..	..	5	12	0	—7
Intermittent	....	....	..	....	....	1	....	....	..	....	..	..	1	5	10	—4
Remittent	2	....	..	3	1	1	....	2	1	....	..	..	10	17	13	—7
Bilious	....	....	..	....	....	1	2	....	..	....	..	..	3	4	8	—1
Typhoid	1	2	3	2	1	....	2	3	3	4	4	2	27	49	40	—22
Typhus	....	....	..	....	....	....	....	....	..	....	..	..	0	3	8	—3
Typho-Malarial	....	....	..	1	1	....	....	....	..	....	..	..	2	1	0	+1
Cerebro-Spinal	....	....	..	1	....	....	....	....	..	....	..	..	1	4	2	—3
Yellow	....	....	..	....	....	....	....	....	1	....	..	..	1	0	0	+1
Frozen	....	....	..	....	....	....	....	....	..	....	..	..	0	1	0	—1
Gravel	1	....	..	....	....	....	....	....	..	....	..	..	1	1	0	0
Gastritis	....	....	1	1	....	....	2	3	2	4	2	1	16	11	0	+5
Heart Disease	1	5	3	6	5	2	2	5	7	4	3	4	47	62	52	—16
Heart, Dropsy of	....	....	..	....	2	....	2	....	..	....	..	1	5	1	5	+4
Inanition	1	2	..	....	....	....	1	1	..	2	..	..	7	7	10	0
Insanity, Dementia	....	....	3	....	1	....	1	....	..	1	1	..	7	1	3	+6
Influenza	2	....	..	....	....	....	....	....	..	....	..		2	0	0	+2
Jaundice	....	....	..	....	....	1	1	....	..	....	1	1	4	.....	.....	+4
Liver, Disease of	....	....	..	....	1	2	1	2	1	....	1	1	9	10	17	—1
Inflammation of	....	....	..	3	....	....	....	....	1	1	..	1	6	0	0	+6
Enlargement of	....	....	..	....	....	....	....	....	..	1	1	..	2	0	0	+2
Lungs, Various Diseases of	1	1	..	3	2	2	1	....	1	....	..	..	11	10	13	+1
Lungs, Inflam. of	2	8	17	15	9	6	4	4	7	10	6	11	99	85	139	+14
Congestion of	2	3	2	....	1	....	1	3	1	3	6	2	24	27	23	—3
Laryngitis	....	....	..	....	....	....	....	....	..	....	..	..	0	4	0	—4
Marasmus	4	1	..	6	4	....	....	3	3	3	2	..	26	18	25	+8
Measles	....	....	..	....	....	1	....	....	..	....	..	..	1	2	40	—1
Nervous Exhaustion	....	....	..	....	....	....	....	....	..	....	..	..	0	5	0	—5
Old Age	5	7	8	22	4	4	3	1	2	2	4	3	65	61	46	+4
Paralysis	2	4	2	....	3	....	3	4	..	1	..	3	22	22	20	0
Pleuritis	....	1	..	1	....	....	....	....	..	....	..	..	2	11	10	—9
Peritonitis and Enteritis	1	5	2	4	3	1	4	8	3		7	3	42	26	0	+16
Puerperal Fever	2	1	4	....	1	....	....	3	2		..	2	16	9	9	+7

TABLE A.—CONTINUED.—*Interments in Detroit, in 1878, 1877, and 1876.*

DISEASES AND CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTALS. 1878.	1877.	1876.	In 1878 More (+) or Less (—) than in 1877.
Puerperal Convulsions	2	----	----	--	----	----	----	----	----	--	----	----	2	4	3	—2
Pharyngitis	----	----	----	--	----	----	----	----	----	--	----	----	0	1	0	—1
Premature Birth	3	1	2	1	2	6	4	----	1	--	----	3	23	14	0	+9
Rheumatism	----	1	----	--	1	----	1	-	----	--	----	----	3	6	6	—3
Scarlatina	16	4	3	10	9	4	5	3	6	4	19	20	103	75	18	+28
Small-pox	----	----	----	--	----	----	-	-	----	--	----	----	0	107	55	—107
Scrofula	1	----	----	--	----	1	1	-	----	--	----	----	3	3	8	0
Spinal Disease	----	----	----	--	----	1	1	1	1	--	----	----	4	9	8	—5
Suicide	----	1	1	1	1	1	1	1	----	1	2	1	11	11	5	0
Sun-Stroke	----	----	----	--	----	----	3	1	----	--	----	----	4	0	0	+4
Still-Born	13	11	6	13	8	14	8	13	15	12	14	20	147	131	185	+16
Teething	----	----	1	3	1	----	3	1	----	3	1	----	13	11	21	+3
Tremens, Delirium	----	----	----	--	----	----	-	-	----	--	----	----	0	1	2	—1
Tumors	----	----	1	--	1	----	1	-	----	--	----	1	4	7	7	—3
Whooping-cough	6	6	7	1	2	3	3	2	3	--	----	----	33	13	21	+20
Unknown	----	----	3	5	2	6	-	2	4	1	1	3	27	48	49	—21
Miscellaneous	11	24	10	14	23	31	34	4	4	4	1	3	163	160	178	+3

TABLE B.—*Interments in Detroit, by Months, in 1878, 1877, 1876, and 1875; Total Number of Interments for each of the years 1872–8 inclusive; and Comparisons of the several years.*

YEAR.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.	More than in 1878.	More than in 1877.	More than in 1876.	More than in 1875.	More than in 1874.	Less than in 1873.
1878	135	148	147	174	161	156	230	186	150	132	135	155	1,909	----	----	----	----	----	597
1877	185	152	178	171	176	148	249	237	153	148	150	158	2,105	196	----	----	----	----	401
1876	128	173	192	182	190	163	288	268	211	142	120	160	2,217	308	112	----	----	----	289
1875	189	168	178	170	177	165	319	244	220	176	146	169	2,321	412	216	104	----	----	185
1874	----	----	----	----	----	----	----	----	----	----	----	----	2,386	477	281	169	65	----	120
1873	----	----	----	----	----	----	----	----	----	----	----	----	2,506	597	401	289	185	120	----
1872	----	----	----	----	----	----	----	----	----	----	----	----	2,390	481	285	173	69	4	116
In 1878 more (+), or less (-), than in 1877	-50	-4	-31	+3	-15	+8	-19	-51	-3	-16	-15	-3	------	----	----	----	----	----	----

Population, as per State census in 1874,—101,245. Estimated population in 1878, about 125,000.

TABLE C.—*The Number of Persons, by stated Periods of Age and at all Ages, Buried in Detroit during the Year, and in each Month, of the Year 1878.*

Ages in Years.	Number Buried, Months and Year.												
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	1878.
All ages	135	148	147	174	161	156	230	186	150	132	135	155	1,909
Under 1	28	39	39	30	19	32	106	65	38	20	19	29	464
1 to 2	9	12	9	15	13	9	19	29	17	7	9	5	153
2 to 3	12	3	8	10	12	7	4	8	1	5	10	7	87
3 to 4	6	1	2	9	6	3	8	4	2	3	7	2	53
4 to 5	2	3	2	4	5	3	1	2	2	2	8	9	43
5 to 10	7	5	3	8	10	6	4	6	7	6	14	11	87
10 to 20	7	10	6	9	17	9	4	6	9	11	5	6	99
20 to 50	25	28	42	28	25	36	16	24	39	35	30	31	359
50 and upwards	21	34	27	31	36	26	40	27	21	30	17	31	340
Still-born	13	11	5	12	8	14	12	13	15	12	14	20	149
Unknown	5	2	4	18	10	11	16	2	.....	1	2	4	75

3. City of Detroit, unless otherwise stated.

4. Less; probably 40 *per cent.* There was comparatively little sickness for the number of deaths.

5. Less by about 15 to 20 per cent. Notwithstanding the increase of population of the city, the mortality in 1878 was less than in any of the six preceding years, the excess of these years over 1878 being 481, 597, 477, 412, 308, and 196 respectively.—*See Table.*

6. Whooping-cough in the beginning of the year, and sore throat during the cold months.

7. I cannot trace the cause except in whooping-cough, which had a fair field, the disease not having been prevalent for some time.

8. All except those mentioned in answer "6" above.

9. Better sanitary condition, possibly the hard times, by compelling people to live on plainer food.

10. Apoplexy, old age, scarlatina, and whooping-cough, as shown by the table. The discrepancy between answers "6" and "10" is apparent rather than real. The diseases mentioned in "6" were prevalent without many deaths, while from those named in "10" there were deaths without so great a prevalence of the diseases. Last winter there were very many cases of sore throat (so-called diphtheria), but very few deaths resulted. In very cold or severe weather the mortality from "old age," is often high with very little sickness. The mortality and amount of sickness varies very much.

11. The increase is so trifling, the cause is probably accidental. There has been no epidemic during the year.

12. Disease of the brain, convulsions, cholera infantum, diarrhea, dysentery, typhoid fever, measles, and small-pox.—*See Table.*

13. From cholera infantum, diarrhea, dysentery, and typhoid fever, to favorable season, and a change of location of the receiving basin of the water-works. The receiving basin was so situated that sewage and other deleterious substance were at times forced into the distributing pipes. The receiving basin is now above the outlet of the sewers. The decrease in the number of cases of convulsions is probably due to the less amount of gastro-intestinal diseases, and hence, in part to the water-supply. From small-pox, to vaccination; a year ago last summer small-pox might be found in almost every part of the city. Physicians were sent at public expense to vaccinate all who required it. The physicians had scarcely completed their work when the disease subsided, and no case has since been reported, so far as I can learn.

14. None.

15.* Yellow fever, one case, imported from the south.

16. No small-pox reported. The table of interments furnishes as reliable data as are available for the others, although the number of deaths varies very much in different seasons from a given amount of sickness. This season the death-rate is high compared with the amount of sickness.

17. Small-pox.

18. I have no reliable information.

19. One case. Came from the South. Not able to learn the exact time between leaving the infected region till the onset of disease.

20. Have seen no case simulating yellow fever nor other unusual fever.

21. No.

24. Not so far as observed.

25–31. There was some disease among cattle, but chiefly among those fed on distillery food. I have not reliable data for these questions.

32. *SUMMARY, for 1878, of certain Meteorological Conditions at Woodmere Cemetery, near Detroit, Michigan, compiled from Observations made by Mr. F. W. Higgins, Superintendent of the Cemetery.*

YEAR AND MONTHS, 1878.	Average Atmospheric Pressure.[a]	Temperature, Degrees F.				Humidity of Atmosphere.		Ozone.[f]		Per Cent of Cloudiness.[b]	Rain and Melted Snow, Inches.	Days Rain or Snow Fell.
		Average.[b]	Highest.[c]	Lowest.[c]	Range.	Relative.[d]	Absolute.[e]	Day, 7 A. M. to 2 P. M.	Night, 9 P. M. to 7 A. M.			
Year	29.320	48.61	97	—14	111	76	3.68	4.69	4.47	51	42.23	165
January	29.381	26.58	49^{20}	0^{7}	49	77	1.58	6.00	6.23	70	2.47	13
February	29.307	26.82	51^{28}	-14^{3}	.....	78	1.61	6.46	6.25	53	3.53	13
March	29.299	40.84	70^{9}	18^{24}	52	79	2.69	6.94	6.13	63	5.10	19
April	29.151	52.70	74^{23}	29^{5}	45	71	3.60	5.37	5.53	53	3.04	14
May	29.294	55.43	79^{20}	30^{15}	49	68	3.84	5.19	5.19	45	3.10	13
June	29.302	64.49	92^{30}	35^{9}	57	71	5.09	4.63	4.07	38	2.19	11
July	29.344	72.95	97^{17}	50^{23}	47	77	6.86	3.32	2.61	42	7.04	12
August	29.271	69.77	90^{8}	45^{26}	45	77	6.17	3.26	2.23	27	2.35	11
September	29.432	63.70	85^{7}	34^{22}	51	79	5.49	3.07	2.73	41	4.19	11
October	29.361	50.08	80^{1}	25^{28}	55	73	3.43	3.81	3.94	45	3.00	13
November	29.366	37.63	55^{10}	18^{5}	37	77	2.36	4.07	3.89	56	2.53	13
December	29.333	22.30	41^{2}	-3^{24}	44	82	1.44	4.16	4.84	75	3.63	22

[a] Reduced to 32° F. (not reduced to sea level); average of 3 daily observations, at 7 A. M., 2 P. M. and 9 P. M. Highest barometer, 7 A. M., Sept. 27, 29.88 in.

[b] Average of 3 daily observations, at 7 A. M., 2 P. M., and 9 P. M.

[c] By registering thermometers. The small figures above and at the right of the numbers denoting the highest or the lowest temperature denote the day of the month on which the highest or the lowest temperature occurred.

[d] Per cent of saturation; average of 3 daily observations.

[e] Grains of vapor in a cubic foot of air; average of 3 daily observations.

[f] Average degrees of coloration, on a scale of 10 (maximum), of Schönbein's test-paper.

Highest barometer, 7 A. M. Sept. 27th, 29.880; lowest, 2 P. M. Dec. 10th, 28.639. Highest temperature, July 17th, 97° Fah.; lowest, Feb. 3d,—14° Fah.—Maximum velocity of wind, Sept. 25th, 50 miles an hour.—Heaviest rain-storm, Oct. 25th, 26th, and 27th, 1.62 inches.—Heaviest snow-storm, Jan. 11th, 11 inches.—Latest frost injurious

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150–176 of this Report. On pages 150–179 is printed a summary of the replies.

to vegetation, May 13th; earliest, Oct. 13th.—Extreme oscillation of barometer, 1.283 in.—Extreme range of temperature, 111° Fah.—Mean temperature, 1° Fah. above the mean for a series of years.—Rainfall 12.15 in. more.

42. The speedy suppression of small-pox by systematic vaccination, so beautifully exemplified in 1877 in this city, suggests the possibility of keeping this loathsome disease almost, if not entirely, in abeyance. 'Tis true nearly all in the city had been vaccinated (?), in most cases with humanized virus, and in many cases by others than physicians; and in all cases where a sore was produced, protection against variola was supposed to be secured. Our school board established a rule that a child could not be admitted to the public school without a certificate from a physician that the person was properly vaccinated. Under this rule I examined a great number of children, and though it may be impossible to determine in every case the character of the scar found, there were very many whose arms presented none of the usual characteristics of the vaccination. From this I infer that there are many who deem themselves duly protected while they carry nothing more than scars from the wounds of the instruments used by the vaccinators. It is not easy in a *free country* to compel people to be vaccinated, but much might be done by the recommendations of those high in authority, say the State Board of Health, to induce all people to have their children vaccinated with bovine virus.

As in previous reports of this kind, data are not so reliable as could be desired, and in some respects are so limited that mere conjecture is all that can be furnished. There are a number of questions omitted, as I have not reliable information on these points. Hoping those given may be of service, I remain,

Yours truly,

441 Sixth St., Detroit, Wayne Co., Feb., 1879. W. H. ROUSE, M. D.

REPLIES BY ROBERT JOHNSTON, M. D., OF MILFORD, MICH.

1*. 1,500.
2. 12.
3. Village of Milford, Mich., and country for six miles out in every direction.
4. I think it was about 8 per cent greater.
5. About 8 to 10 per cent greater.
6. Diphtheria, typhoid fever, and sun-stroke.
7. The excessive hot weather caused one death from sun-stroke and several cases of sun-stroke.
8. I do not know of any.
9. ———.
10. Diphtheria, typhoid fever, and sun-stroke.
11. I know of no cause.
12 and 13. ———.
14. Diphtheria January 14 to February 10, also November 5 to December 28, 1878; typhoid fever August 9 to October 1, 1878, unusually high. Considering the number of cases of typhoid fever and diphtheria occurring here during 1878, I think more than the usual number proved fatal.
15. ———.
16. Of small-pox, 0; of cholera, 0; of scarlet fever, 4; of typhoid fever, 4; of measles, 0; of whooping-cough, about 50; of cerebro-spinal meningitis, 0; of diphtheria, 31.
17. Small-pox, cholera, measles, and cerebro-spinal meningitis.
18. *January:* Intermittent fever, influenza, bronchitis, pneumonia, diphtheria, scarlet fever, rheumatism, and typhoid fever.
February: Intermittent fever, influenza, bronchitis, pneumonia, diphtheria, scarlet fever, rheumatism, and typhoid fever.
March: Intermittent fever, influenza, bronchitis, pneumonia, rheumatism, and scarlet fever.
April: Intermittent fever, influenza, bronchitis, pneumonia, scarlet fever, rheumatism, and membraneous croup.
May: Intermittent fever, influenza, bronchitis, pneumonia, and rheumatism.
June: Intermittent fever, influenza, bronchitis, pneumonia, and rheumatism.
July: Intermittent fever, bronchitis, influenza, diarrhea, dysentery, and sun-stroke.
August: Intermittent fever, bronchitis, dysentery, diarrhea, cholera-morbus, typhoid fever, and cholera infantum.
September: Intermittent fever, diarrhea, dysentery, whooping-cough, typhoid fever, and bronchitis.
October: Intermittent fever, bronchitis, diarrhea, dysentery, whooping-cough, erysipelas, and typhoid fever.

November: Whooping-cough, intermittent fever, diphtheria, dysentery, bronchitis, and rheumatism.

December: Whooping-cough, intermittent fever, bronchitis, diphtheria, rheumatism, influenza, and pneumonia.

19. No.

20. No cases of fever in any way simulating yellow fever have occurred in this vicinity.

21, 22, 23, 24. No.

25. No unusual diseases prevailed among animals.

26. No complaint of any of the diseases mentioned.

27. Very good.

28. No.

29. Yes.

30. Less.

31. About as usual.

32 to 42. I have no data from which to make an intelligible answer.

Respectfully,

Milford, Oakland Co., Mich., March 14, 1879. ROBERT JOHNSTON.

REPLIES BY J. M. SWIFT, M. D., OF NORTHVILLE, MICH.

1.* 2,500 in whole territory, 900 in Northville.

2. Whole district, 22; in village, 13.

3. The locality from which this report is made embraces the village of Northville and contiguous portions of the townships of Plymouth and Livonia, in Wayne county; of Farmington, Novi, and Lyon, in Oakland county; and Salem, in Washtenaw county. Estimated population of the district, 2,500; of this number, about 900 are in the village.

4. About the average.

5. Deaths, 22; average for 5 previous years, 28.4. Deaths in village, 13; average for 5 years, 12.2.

6. None.

7. ——.

8. Diphtheria and typhoid type of fevers less than for two previous years.

9. ——.

10. Nothing especial, unless 4 cases of whooping-cough with croup, 1 case neuralgia of heart, 1 congestive chill, which were unusual for this vicinity.

11. ——.

12. Old age, sudden death, and typhoid fever.

13. Typhoid fever did not prevail.

14. ——.

15. None, except as stated in answer 10.

16 and 17. I cannot accurately,—of small-pox, none; of cholera, none; of scarlet fever, 5 or 6; of typhoid fever, 2 or 3; of measles, none; of whooping-cough, 30; of cerebro-spinal meningitis, none; of diphtheria, none of real form.

18. *January:* (1.) Influenza, (2.) rheumatism, (3.) bronchitis.

February: (1.) Influenza, (2.) scarlatina, (3.) bronchitis, (4.) enteritis.

March: Malarial type to everything, and bowel difficulty of some kind simulating enteritis and dyspepsia.

April: Intermitting fever, mumps, bronchitis; with pulmonary difficulties commencing in March, and increasing in all forms during April and into May.

May: Mostly intermitting fever, catarrh, and influenza.

June: Intermitting fever and some typho-malarial fever.

July: Malarial fever, typho-malarial fever, and whooping-cough.

August: Whooping-cough, remittent fever, intermittent fever, and some bowel complaints.

September: I was absent from the State, and have no record.

October: Typho-malarial fever, intermittent fever, and remittent fever, all very mild type.

November: Nearly the same as October, with whooping-cough and neuralgia during last of the month.

December: Influenza, "mongrel" diphtheria, and whooping-cough.

19. No.

20. ——.

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

21. No.
22, 23. ———.
24. "Stomach trouble" was a common complaint; but nothing severe, as stated above for March.
25. No knowledge.
26. I knew of none.
27. Good, except some cases where wheat was "almost" grown.
28. I think not.
29. Yes.
30. I do not know.
31. About usual condition.
32. I have not sufficient data to do so.
33, 34, 35. ———.
36. About 2½ feet, I think, and not a variable amount of water, to any great extent.
37. From 30 to 50 feet, in strata of gravel upon strata of blue clay. The southerly portion, towards river-bank, nearest surface, and as you go northerly the depth increases. On the south and westerly parts of the village there are very large fountains constantly flowing, probably from same supply as the water in the wells.
38. Not much variation.
39 and 40. ———.
41. Nothing worthy of note in character or communicability of the diseases during the year.

Respectfully,

Northville, Wayne Co., Mich., May, 1879. J. M. SWIFT.

REPLIES BY W. G. ELLIOTT, M. D., OF PONTIAC, MICH.

1. Number of inhabitants, 4,000.
2. Deaths, 50.
3. 6 square miles, 2x3, area of city.
4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15. Sickness and deaths about the same as the average; no unusual prevalence of disease or mortality.
16. Of scarlet fever, 8; of typhoid fever, 5; of diphtheria, 3.
17. Whooping-cough, cholera, small-pox, measles, and cerebro-spinal meningitis.
18. *January:* Bronchitis, influenza, rheumatism, scarlatina, and diphtheria.
February: Bronchitis, rheumatism, pneumonia, intermittent fever, and typhoid fever (enteric).
March: Bronchitis, rheumatism, pneumonia, influenza, intermittent fever, typhoid fever (enteric), and pulmonary consumption.
April: Bronchitis, influenza, rheumatism, intermittent fever, erysipelas, and diarrhea.
May: Bronchitis, intermittent fever, rheumatism, pneumonia, erysipelas, and diarrhea.
June: Intermittent fever, rheumatism, and diarrhea.
July: Intermittent fever, diarrhea, cholera morbus, and cholera infantum.
August: Intermittent fever, remittent fever, diarrhea, dysentery, cholera morbus, and cholera infantum.
September: Intermittent fever, remittent fever, diarrhea, dysentery, and cholera morbus.
October: Intermittent fever, remittent fever, dysentery, and influenza.
November: Intermittent fever, rheumatism, bronchitis, influenza, and pneumonia.
December: Bronchitis, rheumatism, influenza, pneumonia, and intermittent fever.
19. None.
20. None.
21, 22, 23, 24. No.
25. None.
26. Wheat, where there was a great growth of straw, was in a few instances rusty.
27. Wheat was not as dry or as fit for grinding, immediately after harvest as in some seasons.
28. No.
29. Wheat threshed immediately after harvest not quite dry.
30. Not more than usual.
31. No.
32. No observation made.

33, 34, and 35. Not observed.

36. Our wells are subject to but little variation during the year; usually 3 to 5 feet of water.

37. Variable. While we have a few wells that flow, others are from 20 to 30 feet deep; a few are 90 feet deep.

38, 39, and 40. The depth of wells is so variable that it is not possible to estimate, as stated in 37.

Yours respectfully,

Pontiac, Oakland Co., Mich., February, 1879. W. G. ELLIOTT.

REPLIES BY WELLINGTON CARLETON, M. D., OF TRENTON, MICHIGAN.

1.* About 1,000.

2. 10.

3. About two miles north, then three west and south, and lower ⅔ Grosse Isle on the east.

4. Greater, about 25 per cent.

5. About the same as the average.

6. Malarial diseases and scarlet fever.

7. I cannot, except contagion in scarlet fever.

8. Other diseases, excepting those mentioned in answer 6, about the same as in previous years.

9. ———.

10. Scarlet fever. The form of scarlet fever was very light; but previous to the fall of 1877 and spring of 1878 we have had none here for several years.

11. I cannot.

12. Typhoid fever.

13. Perhaps to better drainage.

14. No high rate of mortality, and very low rate among scarlet fever patients. I think only two children died of scarlet fever in this vicinity during the year 1878; one died March 6, the other, I think, in February, so that for all the other months the rate was 0. I presume there were two hundred cases of scarlet fever in this vicinity, many of which were not seen by any physician.

15. No unusual disease, except scarlet fever.

16. Of small-pox, none; of cholera, none; of scarlet fever, very many; of typhoid fever, 2; of measles, 1; of whooping-cough, many; of cerebro-spinal meningitis, none; of diphtheria, 2.

17. See answer 16.

18. I cannot now.

19. I have not.

20. No such cases have appeared that I am aware of.

21. I did not.

22, 23. ———.

24. I did not notice that it was.

25. Horse distemper prevailed nearly all the spring and fall; in several instances during the fall it terminated in inflammation of the lungs, which proved very fatal.

26. Rust appeared about July 1 in Clawson variety of wheat; also rot in grapes about the 9th of August, which destroyed about one-half the crop.

27. All were in good condition, except Clawson wheat, which had to lie some time to harden or season.

28. No.

29. Yes, with the exception of the Clawson variety.

30. About the usual amount.

31. Less.

32, 33, 34, and 35. I cannot answer.

36. In April and May, about full; in June, ½ to ⅔ full, say from 10 ft. to 14 ft. of water; in July, ¼ to ½ full, say from 5 to 10 ft. of water; in Aug., ⅛ to ¼ full, say from 2 to 5 ft. of water; in Sept., ¼ full, 5 ft. of water; in Oct., ⅓ full, 7 ft. of water; Nov. and Dec., ¾ full, about 15 ft. of water; in Jan., Feb., and March, ½ full, about 10 ft. of water.

37. Wells average from 15 to 25 feet in depth; the average depth or elevation of land above water line of river is about 15 feet.

38. See 36 and 37.

39, 40. I cannot say.

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*The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

For information in regard to questions from 25 to 40, inclusive, I am indebted to Mr. James H. Vreeland.

Respectfully,

Trenton, Wayne Co., September 8, 1879. WELLINGTON CARLETON.

REPLIES BY ALBERT YATES, M. D., OF WASHINGTON, MICH.

3. South half of Washington, North half of Shelby, and contiguous parts of the townships of Ray and Macomb of Macomb county, and eastern part of the town of Oakland, Oakland county.
4. The year 1878 was a healthy one, sickness being probably 25 per cent less than in each of the preceding 3 years.
5. About the average number; less than the average number of young persons died, and a greater than the average number of adults.
6. Erysipelas and septicæmia.
7. I can assign no cause but low vitality.
8. Malarial diseases, scarlatina, diphtheria, diarrhea, dysentery, and pneumonia, were less than usually prevalent.
9. I do not know.
10. Erysipelas, septicæmia, and meningitis.
11. Low vitality and epidemic influences.
12. See answer 8.
14. Meningitis in March, erysipelas in April, septicæmia in May, mortality high in each; in diarrhea, dysentery, etc., the mortality was lower than usual.
15. Meningitis in March, erysipelas (phlegmonous) in April, septicæmia in May, apoplexy in May, and ovarian dropsy in June.
16. Of scarlatina, 3 cases, none fatal; of typhoid fever, 4 cases, none fatal; of phlegmonous erysipelas, 4 cases, 2 fatal; of whooping-cough, probably 40 cases; of measles and diphtheria, probably 6 cases, only one of which was serious, and none fatal.
17. Small-pox, cholera, and cerebro-spinal meningitis.
18. The answers to this question are drawn from memory up to the first of April, afterwards they are taken from the disease record:—

January: Influenza, bronchitis, rheumatism, dyspepsia, fevers, etc.
February: As January, with the addition of neuralgia.
March: Rheumatism, bronchitis, typho-malarial fever, and meningitis.
April: Pharyngitis, rheumatism, influenza, bronchitis, intermittent fever, and erysipelas.
May: Intermittent fever, bronchitis, rheumatism, diphtheria, erysipelas, and septicæmia.
June: Bronchitis, intermittent fever, rheumatism, influenza, whooping-cough, and pharyngitis.
July: Eczema, whooping-cough, diarrhea, intermittent fever, dyspepsia, bronchitis, rheumatism, and remittent fever.
August: Bronchitis, diarrhea, eczema, intermittent fever, dyspepsia, dysentery, whooping-cough, rheumatism, and remittent fever.
September: Diarrhea, bronchitis, intermittent fever, remittent fever, rheumatism, influenza, dysentery, scarlatina, dyspepsia, and typho-malarial fever.
October: Dyspepsia, rheumatism, diarrhea, intermittent fever, bronchitis, cerebral hyperæmia, influenza, dysentery, remittent fever, intermittent fever, and typhoid fever.
November: Bronchitis, rheumatism, dyspepsia, influenza, diphtheria, neuralgia, typho-malarial fever, and erysipelas.
December: Bronchitis, rheumatism, neuralgia, dyspepsia, influenza, diphtheria, intermittent fever, typho-malarial fever, and erysipelas.

19. No.
20. I have had no cases resembling it; the nearest were a few cases of obstinate jaundice in the month of December.
21. No.
24. I don't remember, and I have no record of diseases for that period.
25. I have no positive knowledge. During the latter part of the year epizoöty prevailed among horses slightly.
26. Rot, rust, and smut.
27. Fair.
28. Corn and oats.
29. Yes.
30. About the usual proportion.

31. About as usual.
32. I have no data at my disposal except for the period from September 11 till December 31, and which are as follows:—

SUMMARY of certain Meteorological Conditions at Washington, Macomb Co., Michigan, from September 11 to December 31, 1878.

MONTHS, 1878.	TEMPERATURE,—Degrees F.				Barometer,—Reduced to 32° F.	Prevailing Winds.	Rain and Melted Snow, in Inches.	Cloudiness,—Per Cent.	OZONE,—AVERAGE.	
	Highest.	Lowest.	Range.	Average.					Day.	Night.
September....	84	40	44	59.5	.....	S. E. to W.	2.47	40	3.60	3.00
October.....	76	25	51	49.7	29.093	W.	1.80	51.74	4.0	4.25
November	53	19	34	37.7	29.091	N. to W.	2.70	59.55	4.17	4.50
December.....	39	4	35	23.3	29.053	N. W. to S. W.	3.85	85.07	4.20	4.56

36. About four feet.
37. 8 feet to 10 feet, east and south-east, and 25 feet to 30 feet, to the north and north-west.
38. I cannot answer, owing to lack of observation.
39. March.
40. August.

Washington, Macomb Co., March, 1879. ALBERT YATES.

REPLIES BY E. P. CHRISTIAN, M. D., OF WYANDOTTE, MICH.

1. About 3,000.
2. Estimated at from 40 to 50.
3. City of Wyandotte.
4. Greater.
5. Ratio of deaths about as usual.
6. In my own practice, consumption and typhoid fever.
7. The unusual heat and moisture combined, of the summer, undoubtedly increased the amount of sickness and depressed the vital powers of those with chronic ailments, as consumption.
8. The contagious exanthemata generally.
9. ———.
10. As stated in answer to 6, consumption and typhoid fever.
11. Depressing effects of the peculiarities of the summer.
12. From contagious exanthemata.
13. Non-prevalence of the diseases.
14. None with unusually high or low rate of mortality.
15. None of unusual occurrence.
16. Small-pox, none; cholera, none; scarlet fever, sporadic cases occurring from Jan. to May; under my observation, in three months, 15 cases; none observed from May to Nov. In Nov. it made its appearance in one school district in adjoining township, in an epidemic form and of great severity. In Nov. and Dec. I saw 15 cases, all originating in the school of that district. Typhoid fever, from March to Dec.; I observed 10 cases, two-thirds of them in September, October, and November. Measles, none; whooping-cough, a few cases in September; cerebro-spinal meningitis, none; diphtheria, a few mild cases from May to Nov.; erysipelas, several cases in March, May, and July; puerperal fever, three cases in 1878; chicken-pox, a few cases in April.
17. Small-pox, cholera, and measles did not come under my notice.
18. *January:* Influenza, intermittent fever, bronchitis, consumption, tonsilitis, puerperal fever, rheumatism, and scarlet fever.
February: Scarlet fever, intermittent fever, remittent fever, bronchitis, rheumatism, cholera morbus, erysipelas, and tonsilitis.

* The figures beginning paragraphs refer to questions in Circular 29 (printed in smaller type), on pages 150-176 of this Report. A summary of the replies is printed on pages 150-179.

March: Intermittent fever, rheumatism, consumption, scarlet fever, and diarrhea.
April: Intermittent fever, consumption, rheumatism, remittent fever, scarlet fever, croup, and puerperal fever.
May: Intermittent fever, bronchitis, diarrhea, pneumonia, remittent fever, scarlet fever, consumption, erysipelas, and typho-malarial fever.
June: Intermittent fever, bronchitis, typho-malarial fever, pneumonia, remittent fever, diarrhea, and consumption.
July: Intermittent fever, diarrhea, remittent fever, cholera morbus, dysentery, erysipelas, consumption, typho-malarial fever, and rheumatism.
August: Intermittent fever, remitting fever, diarrhea, dysentery, cholera morbus, cholera infantum, and consumption.
September: Intermittent fever, remittent fever, diarrhea, whooping-cough, dysentery, consumption, cholera infantum, rheumatism, cholera morbus, typho-malarial fever, and typho-enteric fever.
October: Intermittent fever, remittent fever, cholera morbus, diarrhea, diphtheria, bronchitis, typho-malarial fever, typho-enteric fever, dysentery, and consumption.
November: Intermittent fever, bronchitis, typho-enteric fever, consumption, diphtheria, diarrhea, dysentery, pneumonia, and scarlet fever.
December: Bronchitis, scarlet fever, influenza, intermittent fever, typho-enteric fever, consumption, remitting fever, and diphtheria.

19. None.
20. ——.
21. The ordinary endemic fevers were of a severer type and more general, and there were more of a typho-malarial type and typho-enteric.
22. No such case under my observation.
23. ——.
24. I think not.
25. The so-called epizoöty among horses prevailed to some extent throughout the year; but not as an epidemic. In the spring there was a good deal of mortality among chickens, but the nature of the distemper I do not know.
26. Potato-rot very generally in this locality.
27. Inferior condition generally from ripening too fast.
28. Not that I can learn.
29. Yes.
30. Larger proportion.
31. Less than usually.
32. Unusually hot and wet summer, following an unusually mild winter.
33. I have no record to enable me to give a sufficiently accurate report on this point.
34. In no month.
35. In Spring and Summer months.
36. I cannot say; but wells which have heretofore become dry in Summer, the past year contained a good supply the year through.
37. From 12 inches in some parts to as many feet in other parts.
38. I have no records on this point.
39. In the Spring and in November.
40. Not at any time.
41 and 42. ——.

Wyandotte, Wayne Co., Mich., Jan. 30, 1879. E. P. CHRISTIAN, M. D.

Some statements in the preceding replies seem worthy of a more extended notice than they received in the summary at the beginning of the article. Dr. Caulkins, of Thornville, states, page 198, that influenza was unusually prevalent in 1878. In reply to question 18, he places it first in order of prevalence for the months of February, June, July, September, October, November and December. He also states that the cause of the disease is not known. But his replies suggest at least two possible causes. In reply to questions 26–31, he states that crops generally, and hay especially, were affected with various kinds of fungi. It is believed that the spores of fungi, as mechanical irritants in the nose, throat, and air passages, perhaps also in some cases by chemical action, may cause influenza. The foggy weather in January, also, in connection

with the cold weather during part of the month (0° F.), and the cold weather of December, in connection with the large amount of ozone in November and December, may have caused the influenza in those months, respectively.

Dr. Caulkins also states, in reply to questions 8 and 9, that pneumonia was decidedly less prevalent in 1878 than usual, but that with regard to the cause of its lessened prevalence he has no satisfactory theory. Certain other facts, and statements contained in his replies, should, however, be considered in connection with this lessened prevalence of pneumonia. There is evidence that the months in which the lessened prevalence of pneumonia was most marked were January, February, and March. Dr. Caulkins, in reply to question 32, states that these months were mild. There is also evidence, in the compilation of meteorological reports for 1878, printed on subsequent pages of this Report, that the temperature of those months was higher than usual. The absolute humidity of the atmosphere, as indicated by observations made by Dr. Caulkins, results of which are published for 1878 in an article on "The Principal Meteorological Conditions in Michigan in 1878," on subsequent pages of this Report, and for 1877 on page 231 of the Sixth Annual Report (for 1878), was greater in January, February, March, and April, and in certain other months of 1878 than in the corresponding months of 1877. As indicated (on same pages) by the average from observations at several stations in the State, the absolute humidity of the air was greater in January, March, and April, and in certain other months of 1878, than in the corresponding months of 1877.

THE RECLAIMING

OF

DROWNED LANDS.

—BY—

HENRY F. LYSTER, A. M., M. D.,

OF DETROIT, MICH., MEMBER OF THE

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON SEWERAGE AND DRAINAGE.

THE RECLAIMING OF DROWNED LANDS.

BY HENRY F. LYSTER, A. M., M. D., OF DETROIT, MICH.

While the necessity of the study of this subject does not particularly belong to the people of this State, yet we in common with the inhabitants of all countries where malarious forms of disease continue to occupy so prominent a position in the sick reports, are deeply interested in any measure that will tend to lessen their prevalence and mitigate their severity.

Situated as we are, with only about one-third of the State below the latitude of the northern limit of malarious fevers (45° N. lat.), yet by far the large majority of our population is to be found in this portion of the State.

The forms of malarial disease which we have had to encounter in later years have been greatly mitigated by the improvement and cultivation of the large portion of the occupied portion of the State, and do not in any degree compare as a general rule with the more intense and virulent fevers found in the latitude south of us.

According to the best information we have been able to obtain, there are about eight thousand five hundred (8,500) square miles of wet marsh or boggy saturated land within our boundaries. Suppose that one-third of this lies south of the malarial limit (45° N. lat.), we would have about 3,000 square miles within the area in which diseases of a malarial type predominate, or about one-seventh of the surface. There can be no doubt from a study of the surface configuration of the State but that a very large proportion of these lands can be drained and made available and profitable to agriculture, and in the meantime diminish very noticeably the amount of sickness and mortality from diseases of a malarial type. The clearing out of the smaller creeks and streams, and the construction of county drains and of private drains, would enable vast quantities to be reclaimed and made salubrious. The gradual decline of several hundred feet in the surface of the country from the central portions of the State toward the litoral margins, shows the possibility of accomplishing a complete drainage of the whole State. A narrow strip of land between Saginaw Bay and Grand Haven rises in Gratiot county only seventy-three feet above Lake Michigan, and divides at this elevation the streams east and west. It is from this limited tract extending east and west between Lake Michigan and Saginaw Bay, that the greatest complaint comes, and this largely on account of damming back the water for lumber purposes in the summer when the streams are low.

The committee has received the following report, descriptive of the condition of a portion of Gratiot county, from a reliable source:—

Maple River strikes Gratiot county about the south center of section 33, T. 9 N., R. 1 W., and runs nearly north for about 2½ miles, and then west-south-west through the townships of Elba, Washington, and Fulton, for about 13 miles, until it leaves this county on section 33, T. 9 N., R. 3 W. The actual amount of fall to river from Bridgeville to the dam at Maple Rapids is 10.82 feet. The dam was finished in

the Summer of 1853. Before the dam was built the river bottoms was good land, covered with good ash and elm timber of a very thrifty growth. It is now all dead by being drowned out, and much is fallen down. Hundreds of acres of land that before the dam was built was valuable are now worthless.

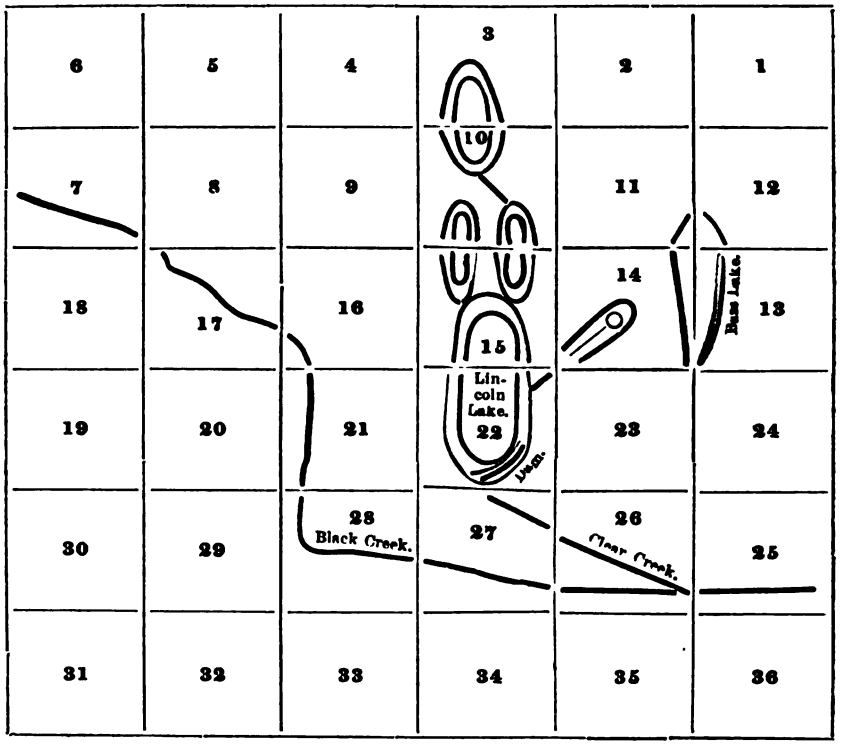
The amount of lands overflowed at low water is about 2,000 acres, and at high water, 4,000 acres. The dam backs up the water for over 10 miles, which causes the channel to fill up; and it is growing worse every year. It is now almost impossible for any one to reside near the river at some seasons of the year on account of sickness caused by the flooding of the river bottoms.

On account of the great amount of sickness caused by the flowing of the lands, about seven or eight years after the dam was built the township board of health of Washington or Fulton declared the dam a nuisance, and commenced suit to have it removed; but on account of the case being badly managed, the county being new, and the dam situated in another county, they did not succeed in having it removed. At the present time the dam is not used for a water-power, but merely to boom a few logs in the Spring. At least three-fourths of the inhabitants in the south part of the county consider it an almost unbearable nuisance, and are very anxious that it should be abated.

These obstructions to streams can be proved to be the cause of sickness, and can be abated by the local boards of health if they proceed according to law. In certain portions of the State the people have insisted upon legal protection and these nuisances do not exist. Reports have come to this Board for several years from the vicinity of Ionia, in the region of Lincoln Lake, Spencer township, Kent county. A diagram of this section, prepared by Mr. Jacob Van Zandt, is presented.

MAP No. 1.

Situation and Extent of Flooded Lands in Spencer Township, Kent Co., Mich.



"The interior lines show the natural extent of the waters of Lincoln Lake and the system of

lakes with which it is connected. Outside lines show how much those waters have been enlarged by flowing the low lands surrounding them. Dark shade at the foot of Lincoln Lake shows extent of water raised by dam at that point. Some estimate the amount of land flowed to be one thousand acres. I think it about six hundred. I would not swear as to the accuracy of this. It is the best I can do. I am not now a member of the board.

JACOB VAN ZANDT."

The water is held back in the Spring to sell in the Summer, when the streams are low, to parties wishing to run logs down Black Creek. The inner lines show the original margin of the lake, and streams running into it; and the outer lines show the margin when dammed. The dam is in the southeast corner of the lake. It is estimated that by this dam between six hundred and one thousand acres have been overflowed. The water is lowered in July and August, leaving the saturated soil and whatever vegetable growth may have been upon it to decomposition by the heat. It is hardly necessary to relate that this nuisance has seriously impressed the vicinity.

THE FARM OF WM. M. CAMPBELL.

The farm of Wm. M. Campbell, of Belvidere, Macomb county, lies between the mouth of Clinton River and Lake St. Clair. It was worked and produced the usual variety of crops until 1836, when it became submerged on account of the rise of the lake level. It has been submerged a great part of the year ever since that date until 1865. It was bought by James L. Conger in 1835 for $10,000. Mr. Campbell purchased it for $2,600 in 1859. Mr. Campbell took it at appraised value of $3,000 in 1874. The soil is a vegetable mould, with sand, and with lime from a great quantity of shells. This is from two to five feet in thickness, lying upon a subsoil of impermeable clay one hundred feet in thickness to the bed rock, which is a black shale. There are no springs of water, but the water is received from the river and lake upon the surface. The land was a wet marsh producing only marsh grass, wild rice, and flags, and to all appearance was as level as the lake. There was a slight rise at the shore of the lake and at the bank of the river. The whole amount of land deeded was five hundred and sixty acres. Of this, one hundred and seventy-five acres have been reclaimed, and about one hundred and twenty-five acres are susceptible of reclamation by the processes used by Mr. Campbell. He began by making a six-foot ditch around the 175 acres, throwing the earth upon the outside. He then put up a wind-mill and a large pump, to relieve the land of the water falling upon it and to remove what little leaking occurred, the latter being of no consequence. He also put up a wheel with fans in a circular box, to be worked by horse-power, in case of a storm, or to throw water into the land in case of a drouth. With this wheel and a span of horses he states that he can remove all the water that could come to it in two ditches six feet wide and two feet deep at the speed of a mill tail. He chose time to ditch when the water was low in the lake. The ditches already made cost fifty cents per rod. He believes that the expense of running a ditch through the marsh where the water is six inches to one foot in depth would be about $2.00 per rod. He has now fifty acres of wheat growing on land formerly covered by water and growing wild rice and marsh weeds and frequented by muskrats. The soil holds wheat well over winter and allows of its perfect maturity. Mr. Campbell remarks that when wheat and timothy do well all the other crops of this region will do well. He knows of a good deal of land in that vicinity which can and will be reclaimed. He had no estimates made

by any engineer but determined everything himself, and worked according to his own ideas. The wind to and from the lake keeps up a circulation of air, and he reports the health of the men who work upon the farm as good. The windmill kept the farm dry last year and only run one-eighth the time. He states that he can throw off the water after a heavy rain in a couple of hours with the wheel and a farm team. He makes no account in his expenses of this relief of the farm as he makes the windmill take care of it. The quality and quantity of the vegetables and grasses is very superior. He says we seldom have frosts which injure anything, frequently pumpkin vines last into November. After a ditch is put around at a cost of from 50 cents to $1.00 per rod, it takes three good horses to break up the first time, and from one to two years to thoroughly mildew and rot the sod. Then the soil is black and mellow and absorbs all ordinary rains.

THE CHANDLER FARM (BELONGING TO HON. Z. CHANDLER, OF DETROIT).

The committee are indebted to Hon. R. E. Trowbridge, who managed it for five years, for a description of the Chandler Farm, twelve miles from the State Capital, in Ingham county. It was originally a lake covering about five thousand acres. This gradually filled up with vegetable material, and the sod of the marsh grass extended over it. He had seen cattle obtain water through this sod by standing for some minutes in one spot until the water came over it. Mr. Chandler's farm embraces about two thousand acres of this five thousand acre tract, extending from an open pond known as "Parke Lake," covering about two hundred and seventy-five acres, to an outlet known as "Plumb Creek" which empties into the Looking-glass River, eight miles away. This brook was a circuitous and clogged up channel, very sluggish, although the fall was about eight feet in four miles distance. Mr. Chandler opened this stream by cutting a new ditch about fourteen feet wide at the top and an average depth of four feet. The effect of this was to lower the water on Parke Lake about three feet. Into this main ditch he has opened a large number of lateral ditches, most of them six feet wide by two and one-half feet in depth. There are about forty miles of lateral ditches. These lateral drains have not yet reached more than one-half of the farm. Together with three hundred acres of Mr. Downer, a neighbor, only about fifteen hundred acres have been ditched, aside from the general benefit afforded the whole five thousand acres by the lowering of "Parke Lake" by the main ditch.

If all the owners of this overflowed land would follow the example of Mr. Chandler in this matter, the whole tract of five thousand acres could be reclaimed. The system of drainage has been carried far enough to show that success is possible, and that it is only a question of time and outlay to enable these lands to be productive and profitable, at least as meadow and pasture lands,—and he believes eventually as plow lands, at least for summer crops, especially for corn and root crops. As regards the healthfulness of the vicinity, before the improvement there was nothing unusual as compared with other places in the vicinity; since the drainage it has been remarkably healthful on the farm. Mr. R. E. Trowbridge had a large family living with him on the place, never less than ten and sometimes as many as thirty for several months, and had but very seldom a case of sickness.

THE FARM OF GOVERNOR CRAPO.

I am indebted to the pen of Dr. J. C. Willson, a son-in-law of the late Gov. Crapo, for the following description of this farm:—

One farm in the township of Gaines, Genesee Co., near Flint, that now contains 1240 acres, had originally about 800 acres of marsh land. It was covered, most of the year, with water, and grew nothing but willows, wild grass, and brushwood of different kinds.

The fall from upper end to Swartz creek, into which he drained it (a distance of 3 miles), was 12 feet. The main ditch was 3 miles long, 11 feet wide at top, and 5 feet at bottom, and 4½ to 5 feet deep. Other smaller drains opened into this one, at different points, and thus the drainage was made complete.

The cost of this work, which was done in 1862, when labor was high, I am unable to give you.

The land was owned by the State, and entered at the usual price, $1.25 per acre, and paid for with swamp land scrip. The cost per acre (after drainage), of reclaiming, was slight. Five men with three teams, two yokes of oxen, and a span of horses, plowed two acres per day. Upon this land, plowed in that way, I saw grass seed sowed in June (timothy and clover) that produced 1½ tons of hay per acre, mowed by machine the following August. The following season we mowed 3 tons to the acre. We frequently mow two crops of hay the same year on this farm. We have also grown corn, oats, barley, and roots, with good success on these marsh lands. From 100 to 150 bushels of corn, in ear, per acre, is the usual yield; of roots, bagas, and mangles, from 500 to 1,000 bushels, according to season, and luck we have with seeds, etc.; of oats, from 70 to 100 bushels. Millet and hungarian grass, and corn for feeding cattle in times of drouth, grow luxuriantly. I cannot give you the exact amount, but may safely say, they equal and often surpass any similar crops on the adjacent uplands. The grasses grown on this marsh are very nutritious, and good for fattening cattle and stock. We have wintered over 300 head of cattle this winter, about 100 sheep, and 40 to 50 horses, colts, etc., and will have between two and three hundred tons of hay left over. We feed out on the farm all we raise as a general rule. The effects on animal life have been very favorable. Owing to the peculiar virulency and intensity of the miasmatic poison generated in the ground, this marsh, when I first commenced practicing medicine here in 1857, had acquired the name of the "*dead marsh*." It is now one of the healthiest localities in the county. In fact, it is very rarely that any of the workmen or children on the farm are sick. The whole neighborhood for miles around is also thus favorably affected. Our cattle, horses, and sheep thrive and grow fat, and we rarely have any sick ones, or lose any by death otherwise than by accidents.

The value of the land now (without buildings) is about $30.00 per acre. I have an offer of that amount per acre for over 200 acres, off the east end (lowest part), which we consider the poorest, but this has been refused. It is considered worth as much as the uplands contiguous, and will sell for as high a price.

In the township of Burton, east of the city, the Governor reclaimed another marsh farm of 320 acres. Like the Gaines marsh, it too was covered with water nearly all the year round. The fall to this was greater than the other, being about 7½ feet to the mile, and the ditches were smaller in proportion. This farm is now (or at least 160 acres of it) owned by Thos. Foster, and was sold to him a few years after Gov. Crapo's death at $100.00 per acre. The Governor bought it in 1860 at $4.00 per acre from a party who had located it. On the part sold there was a frame house and barn of moderate pretensions. House and barn cost about $1,500. The 160 unsold, which we rent to Mr. Foster, has some upland, but of the same general character as his, and its present value is about $60.00 per acre. We refused $75 at one time, but values of lands have shrunk since then. All that I have said of the other farm in regard to productiveness and effects on health of locality, may be said of this one.

Another effect of the drainage on both farms, that I have not mentioned, is, that we can get on to it usually from one to two weeks earlier to work in the Spring, than we can on the uplands. We also have pasture 10 days or two weeks earlier for our cattle. Our experience is, that it pays, both in an economic and sanitary point of view, to drain and reclaim and cultivate these swamp lands. * * * *
The amount of marsh land drained by the Governor was not all owned by him. There is over 1,000 acres of marsh, probably 1,500 all told.

We are indebted to the *Michigan Homestead*, of Detroit, for the following report of an address of Hon. James Birney, U. S. Minister at the Hague, before the Bay City Farmers' Institute, upon the application of the Holland drainage system to the Saginaw country:—

A COUNTRY FISHED FROM THE SEA.

Holland has a world-wide reputation for having conquered territory from the sea, for having removed lakes, and for having made beautiful and profitable homes for many of her population on ground heretofore waste and only the abode of the inhabitants of the deep. To accomplish this, almost insurmountable obstacles have been encountered and overcome. The larger portion of the eastern side of Holland is below the level of the Rhine, as well as of the canals which form the main arteries for drainage. Holland, many centuries ago, was almost covered by the spreading out of so many mouths of the Rhine. The area of water was greater than the area of land. This river, from its source in the glaciers of Rheinwald, flows through gorges of mountains, snow-capped most of the year, along the hills of Germany, conveying the waters of a basin of 65,000 square miles, and is therefore subject to freshets and floods. As it brings down much of the soil of the rich region through which it meanders, it elevates its bed by continuous deposit. Its flow must therefore be restrained by raising its banks, and by making permanent levees along its sides. As many of the canals empty into the Rhine, in order to have outlet to the sea, they must be higher than the river, to have flow. The superfluous water, that falls upon the country, must be raised high enough to be poured into these grand arteries, and thus be taken off. The superfluous water is very large in amount, for the reason that the rain-fall in Holland is much more than ordinary. During the year just past, there were in Holland only 135 days without rain.

The outflow of the water to the sea is always arrested for a time, when strong winds prevail from the west. For so long as the current of the Rhine at its mouths, is driven backward, the outward flow is of course stopped, and the canals are full. The sea is kept back both by natural and artificial embankments. Upon that portion of the coast where the surface is sandy, the winds pile the sand up sufficiently to form an absolute barrier to the inroads of the sea. Where the soil of the coast is mucky or alluvial, long artificial mounds of sufficient breadth and height have to be constructed. These are repeated at intervals, so that if the first gives way, the second may withstand the forces beating against it.

EXTENSIVE SYSTEM OF DRAINAGE.

For the purposes of drainage the interior lands are divided into districts, and put under the care of a board, whose duty it is to see that everything necessary is attended to at the proper time. A light tax is assessed upon the land in each district, in proportion to the labor that may be expended upon it, in order to meet expenses. This vast enterprise and the maintaining of the system by which it is made a success, has been accomplished by a large expenditure of money and labor. The same population could have acquired in the United States territory enough to have made a State twice the size of Holland, for half the money. Harlem Lake, near Amsterdam, that a few years ago covered 56,000 acres, has been thrown into the sea, and the same area is now dotted with villages and cultivated in farms that yield profitable returns, the land selling readily and for nearly enough to pay the entire expenditure. And the time is not far distant when the Zuider Zee, or South Sea, will in the same way be converted into arable land. The drainage of the cultivated land is nearly altogether by open ditches. The rainfall soon finds its way into these, and is lifted to the main canals by windmills. When the land is very low it is plowed into ridges, so as to give quicker transit for the water.

THE RHINE VS. THE SAGINAW.

The *Netherlands*, or low lands bordering on the Saginaw River, are almost the exact counterpart in appearance of the Netherlands near the mouth of the Rhine. When they are intersected by ditches and covered with rich green pastures, with fat cattle grazing upon them, the one will scarcely be told from the other. As to their recuperation by drainage, and conversion into tillable lands, the problem is as simple as anything can be. Any portion of them, whether it be 40, 80, 160 acres, or a section, when surrounded by ditches, which by some means are kept dry, are redeemed. The earth taken from the ditches should be sufficient to make an embankment that will exclude the flow from neighboring lands from a freshet or from the backset of the river. At the lowest corner of the ditches there might be placed a windmill, that can be built for less cost than a hundred dollars, which would in a short time clear the ditches of water. It would be thrown up by paddle wheels into an outer ditch communicating with the river. The land would be practically elevated in proportion to the depth of the ditch.

FEASIBILITY OF DRAINAGE.

The entire land could be drained at less expense than the same area of timbered land could be cleared, and made ready for culture. It would have the advantage of being without stumps, of being on the border of a navigable stream and having under it an inexhaustible bed of salt. Suppose a ditch was made on each section line and of so much width that the earth thrown out, would make a good road. It would serve the two useful purposes, of drainage and travel. As nearly all the Saginaw land is in some slight degree higher than the river, the labor and expense of pumping out would be very slight.

The embankments in the Netherlands have in large part to be made of sand. The water oozes through. But the clay of the Saginaw land makes such an impervious putty that it would well exclude water. The process is indeed so simple that it would already have been put into extensive operation in the Saginaw valley, if other lands had not been so easily obtainable. But now, as if attention being more generally turned to agriculture, it is worth the cost to any owner of such land to elevate it by ditches. So soon as the water is removed, and the land changed from a soaked to a dry condition, the sourness will disappear, and it will produce grapes and grains of the first quality.

A sample of the change may be seen in the prairie lands of ex-Senator Chandler, near Lansing, who was induced to buy them and experiment from what he saw during a visit to Holland. It may yet be found that the most successful way of dredging the Saginaw river is to raise embankments on either side, and thus by confining its waters increase the force of its current.

Concerning the practical application of these plans, a report has been made by the Hon. A. B. Miller, of Bay City. The following quotation has been taken from the *Michigan Homestead* for July 10, 1879:—

THE THEORY TESTED.

In connection with this subject we give the following extracts from a paper by the Hon. Albert Miller, of Bay City, relative to an extensive enterprise undertaken by Mr. Daglish and himself.

In 1860, says Judge Miller, upon ascertaining that the salt rock underlay the whole of the Saginaw Valley, Mr. Daglish and I anticipated an extensive business in the manufacture of salt. The only methods then known for reducing the brine was by solar evaporation and the old-fashioned kettle blocks. Believing that the prairies would be extensively used for evaporation works, and the navigable waters for transportation, we purchased a sufficient quantity of swamp land to secure two miles of the navigable portion of the Cheboyganing creek, with a view of its future use for purposes above referred to; but time developed a cheaper process for making salt than even by solar evaporation, so the idea of using the land for that purpose was abandoned.

After determining to prosecute the work, we secured the services of Mr. Joseph I. Forcier, through whose practical knowledge of the work of dredging and untiring industry in prosecuting it our operations have been greatly facilitated. By Mr. Forcier's advice we hired the dredge from the corporation of East Saginaw, at the rate of ten dollars for each working day it should be in our possession. After fitting the dredge for work, Mr. Forcier hired his assistants and commenced work on the eleventh day of May, 1878, and during the next ninety-six working days excavated a ditch thirty feet wide averaging nearly six feet deep, three and a quarter miles long, throwing the earth outside, making an embankment of thirty feet wide at the base and five feet high, which has proved effectual in keeping out the water. The depth of water on the land for about two-thirds the length of the line of ditch, was from one to one and a half feet, under which—for the first foot and a half, was a layer of decayed vegetable matter of the color of black snuff, under that was one foot thick of a substance (largely intermixed with decaying shells) which partakes of the properties of the layers directly above and below it. The layer below I supposed was a fine quality of clay for brick making till I learned from Professor Kedzie, after he had analyzed a sample of it, that it was marl, containing thirty-six parts of carbonate of lime and sixty-four parts of clay, or a matter that was insoluble in acid, and that it was valuable as a fertilizer of land; and also, that upon a test by burning like other lime, grinding and mixing with sand, it might prove valuable as a water lime. The ditch and embankment of the south line of our improvement is over one mile in length, running from the creek directly east to the timbered land. Our ditch and embankment surrounds on three sides seven hundred and sixty acres of land, about six hundred acres of which is prairie and fit for the plow. On

the southeast it connects with our partially cleared timbered farm of one hundred and sixty acres.

PUMPING AND DITCHING.

After completing our embankment we procured a twelve-horse-power steam engine and two of Rumsey's rotary section pumps, one with a discharge pipe of six inches, and the other four inches, the two calculated to discharge four thousand gallons per minute. We commenced pumping about the 15th of September and run our pumps night and day for six weeks in clearing the water from the surface of our land, and settling it in the ditch, six feet below the surface of the river. That tested the sufficiency of our bank to hold back the water; we found no leakage through any part of it. After pumping out the water as above stated we commenced a series of ditches through our land all running to the main ditch. From the northwest to the southeast corner we made a ditch four feet wide at the surface, two feet deep and one and a half feet wide at the bottom. This ditch runs nearly parallel with our northeast line, into which all the water coming from the east will flow. From the main or dredge ditch on the west, to the one above mentioned, at an interval of each forty rods, is a ditch three feet wide at the surface and one and one-half feet deep, and one and one-half feet wide on the bottom, making of small ditches six miles. Upon ditching in the lower portion of our land we found it porous and like a sponge filled with water, but after a few days of drainage through the small ditches it settled and became so firm that a horse could be driven over it without difficulty, and with a small additional outlay for small ditches, we think our drainage sufficient for all practical purposes.

THE COST.

I will state that all our expenditure, including the cost of dredging and ditching, the cost of the engine and pump and the pumping that has been done, also of the house and the estimated cost of a gate and sluice between the ditch and creek, and for completing our embankment, and enclosing the whole with a fence, amounts to a trifle over seven dollars per acre for the seven hundred and sixty acres enclosed and drained.

THE PROSPECT.

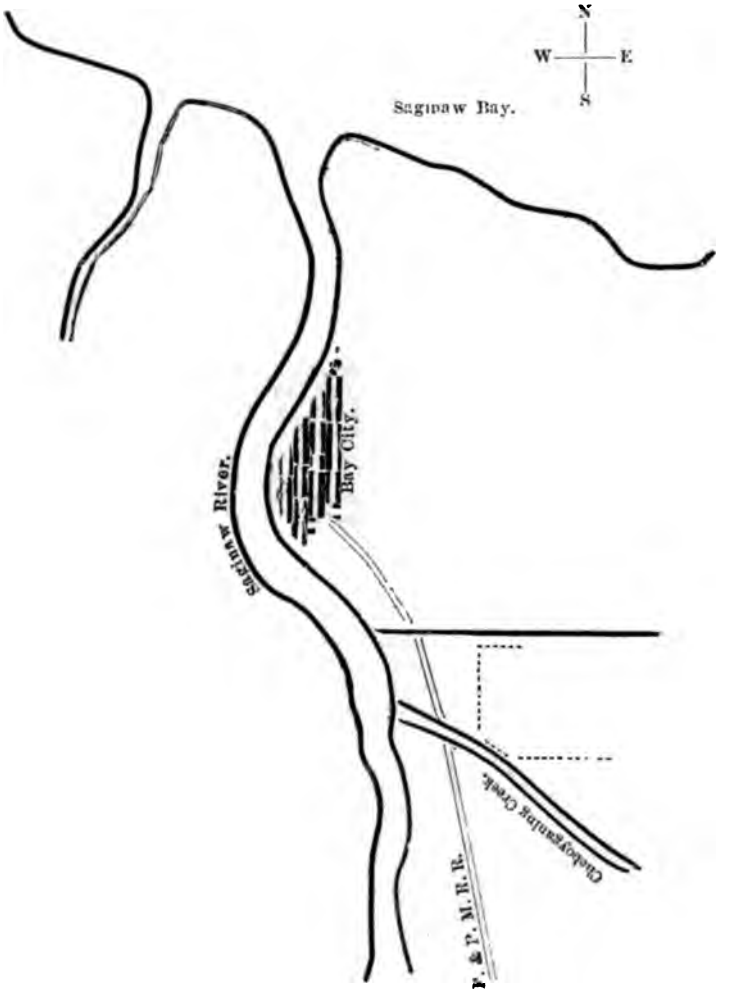
We intend to commence plowing on that, and continue our operations as the land becomes dry enough, and put in such crops as shall indicate the greatest profit by production, or in subduing the turf for future cultivation. We do not expect large crops for the first or second year. Our intentions are to stock down a large portion of it, as soon as the soil is in a fit condition, to such grasses as will be profitable for stock feeding. On some of the lowest part of our land, which is covered with a heavy growth of reeds and rushes, we shall try the experiment of burning, and harrowing in grass seed with plowing. It is now half a century since the Saginaw country first became known to the whites, but the marshes between Bay City and Saginaw present a less pleasing view to the beholder than they did when the eye of the white man first glanced over the broad expanse. But I believe that whoever passes over our thoroughfares between the towns above mentioned, fifty years hence, will be presented with far different views. Instead of the unsightly appearance of reeds, rushes, wild grass, and pools of water, the traveler will behold large fields of waving grain, and extensive meadows covered with nutritious grasses for stock feeding, and herds of cattle resting in the shade of groves which dot the landscape, with occasionally a farm-house to relieve the eye from the monotony of so much natural beauty.

The following letter from Judge Miller, relating to the same subject, is of a later date:—

BAY CITY, Sept. 1, 1879.

H. F. LYSTER, DEAR SIR:—Yours of August 29, is at hand. The enterprise proves a complete success. We have ploughed over two hundred acres of the land this season, much of which was wholly covered with water last year. We are now putting in fall wheat with as good a prospect for a remunerative crop as from any land in the vicinity. Our embankment is a complete barrier against the water. No pumping has been necessary since the Spring rains were pumped out.

MAP NO. 2.



Drainage of Lands owned by Judge Miller and Mr. Daglish, in Bay County.
....., the dyke.

I will mention a project for drainage which is talked of in this community, the idea of which originated with Thos. H. McGraw, Esq., who has had some experience in draining land by pumping. It is to run an embankment from the one made by Mr. Daglish and myself across the Cheboyganing creek (which is but a little more than a bayou from the Saginaw river) to the track of the Flint and Pere Marquette Railroad, a distance of from one-quarter to one-half a mile, and with steam power pump the water out of the creek, which has sufficient depth to furnish all the drainage necessary for thirty or forty thousand acres of contiguous low land. The project is considered entirely feasible by those who know the situation; and aside from the large amount of valuable land that it would reclaim, it would be of great sanitary importance, as it would reclaim one-half the land between Bay City and Saginaw from a miasmatic marsh to cultivated fields. It is well worth the attention of capitalists and philanthropists. Come up and see the situation, and give the matter publicity.

Yours truly,

A. MILLER.

The following report by M. Chambrelent, chief engineer of bridges and highways, annual report of bridges and highways, 1878, Paris, has been introduced to illustrate the influence of drainage upon the moral and physical condition of the inhabitants of a very extensive paludal region:—

REPORT ON THE DRAINAGE AND AGRICULTURAL IMPROVEMENT OF THE "LANDES" OF GASCONY, FRANCE.

CHAPTER I.

Description of the "Landes." First experiments made in 1849, prior to the law of June 19, 1857.

The whole extent of country designated by the general name of "Landes" and situated between the ocean and the valleys of the Garonne and the Adour, represents an area of 8,000 square kilometers (5,200 sq. miles), or 800,000 hectares (2,000,000 acres Eng.), the whole of which, twenty years ago, was still wild and uninhabited. Here and there at long distances apart, a few isolated huts and occasionally a pine thicket inaccessible during the winter, owing to the surrounding inundation, were the only features to relieve the utter monotony of the desert.

That portion of the country which was then totally devoid of inhabitants or cultivation is indicated on the map hereto appended by a pale black tint.

And yet, this immense desert lay almost at the gate of Bordeaux, one of the largest cities of France, and enjoyed one of the most favorable climates for vegetation in all Europe.

From time immemorial many and repeated had been the attempts to bring under cultivation these vast and useless regions; but, as a general thing, not being based on a careful study of the physical condition of the land, they had invariably failed, and for the following reasons: first, the utter neglect to render the soil normally fit for cultivation before any attempt at tillage; and second, because, while endless labor and enormous pecuniary outlay were sacrificed in order to impart to the soil qualities denied it by nature, and to derive from it products incompatible with its character, no heed was given to other qualities fully as valuable, which it abundantly possessed, and which, aided by moderate efforts were to render it one day rich and productive.

We will first describe the physical features and the character of the soil of the "Landes" from an exhaustive study of the country, the results of which will be seen to follow in natural sequence.

PHYSICAL FEATURES AND CONSTITUTION OF THE SOIL OF THE "LANDES."

The "Landes" of Gascony form a vast table-land, almost entirely horizontal, and presenting an average elevation of 10 metres (32 ft.) above the sea level. The soil is poor and sandy, without the least trace of clay or marl, and rests at an average depth of from 30 to 50 centimetres (12 to 20 in.) on an impermeable substratum.

This impermeable substratum, 40 to 50 centimetres (16 to 20 in.) thick and known in the country as the *alios*, is composed of a silicious sand held together by vegetable substances forming a kind of organic cement.

During the summer season the surface of the plateau is totally dried up; in winter, however, the profuse rains peculiar to that part of the ocean coast deluge the table lands during six months of the year, and this large quantity of water, deprived of all escape, either in the interior of the ground or on the surface, remains stagnant until the summer heat gradually removes it by evaporation; thus a flooded country the whole winter, a dry, burning sand during the summer, were the chief characteristics of that region.

Let the reader now imagine the result of this perpetual alternation of a six months' flood and a long drouth, and he will easily understand the agricultural barrenness of the soil and its insalubrity for the animals and the few wretched inhabitants who labored thereon. One will readily explain why failures were the invariable result of all those attempts at improvement made before it was thought essential to remedy those two defects so fatal to all agricultural development whatsoever.

NECESSITY FOR A PREVIOUS DRAINAGE.

A previous drainage of the "Landes" was therefore not only a useful improvement; it was an indispensable condition for their cultivation, and it may be stated unhesi-

tatingly that the chief cause of so many failures in that country was that no one had hitherto recognized this imperious necessity of providing for the escape of the surface water, preparatory to attempts at cultivation.

We may remark, however, that land in the "Landes" region had always been rated so low in value, and that, as a general thing, the process of draining a marshy district necessitates such a considerable pecuniary outlay, that hitherto even those individuals who recognized the necessity of draining, had been deterred from the attempt by the great expense necessary to incur in the process.

A little reflection will show that drainage, properly so called, that is, the evacuation of water through underground pipes, is clearly inapplicable in the present case. The low value of the land compared to the great cost of pipe drainage, the utter absence of clay in the country, the impermeable "alios" stratum to cut through, and last, the character of cultivation adapted to the soil, and consisting principally in the growing of forest trees, the roots of which extend in all directions, are so many facts which will always render this mode of drainage impracticable in the "Landes."

In spite of all these obstacles, one wealthy land-owner, and one only, did try the experiment, and after two years of very costly labor, found himself compelled to abandon it entirely.

If, however, we examine carefully the general physical features of the "Landes" table-land, we recognize a remarkable fact which characterizes the entire extent of the country, and which must render the desiccation of the soil both easy and moderate in cost. From the culminating point of the plateau to the points where the watershed of the valleys commences, in both opposite directions the whole surface gradually slopes in a remarkably regular manner; nowhere does the ground shape itself into swales and necessitate thereby special work for the escape of the water. This slope is so gentle that the least obstacles, or rather the natural irregularities of the ground, are sufficient to counteract it, and to prevent the waters from running down hill.

The slope of the ground over vast distances scarcely reaches the proportion of one millimetre to one metre (1. to 1,000.); but it follows constantly the same direction, without any appreciable counter-slope at any point whatsoever.

On the other hand, these irregularities of surface which thus prove an obstacle to the escape of the water, never rise beyond a maximum height of 30 to 40 centimetres (12 in. to 16 in.)—so that should a ditch of 50 to 60 centimetres (20 to 24 in.) depth be opened over any portion of the "Landes," care being taken to run the bottom line of the ditch in a direction exactly parallel to that of the general slope of the land, we may predict with almost absolute certainty that the ditch will be completed along its whole length without necessitating any cuts deeper than 60 to 70 centimetres (24 to 28 inches) as an average, and that it will perfectly carry off all the water that may reach it; furthermore, that passing through a loose sandy soil it will attract water from considerable distances, and as the slope of the ditch, though sufficient to carry off water, is never more than one to three in the thousand, the water will run down slowly and regularly and without undermining the banks.

Owing to the great looseness of the soil, these ditches may be located pretty far apart and yet prove sufficient for the complete desiccation of the ground.

From this system of drainage which we published in 1849, after seven years of investigations and local surveys, we confidently expected sure and important results, the more so from the observation we made of the fact that wherever we examined those pine thickets scattered far apart over the immensity of the "Landes" desert and which give shelter to a small cottage surrounded by a stray patch of cultivated land and a rich forest vegetation, we found that the character of the soil in no way differed from that of the wild regions. The "alios" was just as close to the surface; a chemical analysis of the soil gave absolutely the same results; one point of difference alone struck us,—we always found the pine thickets in localities, rare enough indeed, where the ground was blessed with natural drainage.

We naturally inferred that if all the uncultivated ground could be placed in the same condition which marked that of the pine thickets, the great problem of redeeming the "Landes" country would be solved.

Nevertheless, numerous objections were raised against our propositions. These ditches which we purposed to open through a sandy soil would surely, we were told, be filled up by sand storms, damaged by the trampling of cattle, or undermined and cut up by the running water.

Another objection was, that the flat portions of the country were so very extensive and so remote from the smallest valley where the waters could discharge themselves, that in spite of all the ditches opened along the surface of the plateau, said waters could never reach such far distant valleys.

It is but just to add, that at that time the country had not yet forgotten the striking failure of the agricultural society of Arcachon, failure similar to that of all the preceding attempts made in the country. That society, established in 1837, although directed by highly distinguished intellects and the wealthiest capitalists, had squandered several millions (francs) on an area of 20,000 hectares (45,000 acres) without meeting with any successful result.

To sum up, such were the objections, so strenuous the resistance we met on all sides, that in order to test our ideas in a practical manner on a scale of some magnitude, we were compelled to make the experiment ourselves on ground purchased for that purpose.

For this first trial we selected a lot of 500 hectares (1,250 acres) in the very center of the most barren portion of the country, in the township of Cestas, where the conditions for drainage were of the most unfavorable nature.

This piece of ground, situated on the highest point of the plateau which intervenes between the watershed of the Garonne and that of the Atlantic, along a line running from Bordeaux to "La Teste," sloped altogether 5.58 in. (18 ft. 5 in.) in 6 kilometres (3¾ miles), that is, hardly one in one thousand.

On the other hand, the alios substratum came within 30 cent. (12 inches) of the surface, which left only that same thickness of soil adapted to vegetation.

But we enjoyed at least one advantage: this piece of land being situated between the departmental highway, from Bordeaux to La Teste, and a classified township road, along which we were allowed by the town council to open large ditches, was thus within reach of four large mains wherein we could throw our drainage water and render its escape a matter of certainty.

On the 25th of June, 1849, the date of our purchase, this area was still covered with stagnant water to such a degree that *it could not be visited except with the help of the stilts habitually in use all over that country.*

The cost of the work reached a pretty high figure; it amounted to 25 francs ($5.00) the hectare (2½ acres, $2.00 per acre), that is, more than twice the average price of the land at that time. This figure, however, must be considered as the maximum expense, considering the difficulty of draining one of the flattest districts of the "Landes," and the necessity of opening, at our sole cost, several mains which could have been used at the same time for neighboring lots. We will, in the sequence, show how much that original cost has since been reduced.

The effect of our ditches, thus constituting a real system of open-air drains, was complete and immediate. The soil was so thoroughly dried that during the heavy winter rains, while water was running abundantly and regularly down the ditches, nowhere on the surface could the least pool of stagnant water be discovered; the rain water on falling down immediately sifted through the soil and reached the ditches without even so much as forming rills along the surface.

The regularity and slowness of motion of the water in those ditches may be realized from the fact that in twenty-seven years, during which they have received and conveyed away all the water that fell on our property, and even water from other land higher up, none of them has ever been either filled or damaged by undermining.

Drained in this manner, the ground was ready for any cultivation adapted to the nature of the soil, but in a pure sand like this, without the least admixture of marl or clay, grain could not immediately be raised on any extensive scale without enormous expense. In lands of good quality well supplied with manure and an abundant population of workmen, the cultivation of cereals is found to barely pay; what could have been expected from its introduction on a great scale in the "Landes" where almost everything is lacking, improvement, workmen, and fertilizers?

On the contrary, forest cultivation which succeeds so well without care or effort, spontaneously in fact, on those points where the ground is naturally drained, was clearly indicated as the obvious mode of utilizing, immediately after desiccation, all this vast expanse of land where the necessary elements for a higher class of cultivation could not be obtained at once.

The loose soil of the "Landes," otherwise so well adapted to forest growth, specially that of the pine and oak, is further placed under a climate second to none in France as regards vegetation. The air is stimulating; from the month of March the sun is already warm and fertilizing, while the early Spring months are marked by frequent rains caused by the near proximity of the sea and by the ocean winds which often prevail along the coast, but are diverted from the "Landes" by the elevated downs that fringe the sea shore.

The permanent stagnation of this rain water on the surface, owing to the imperviousness of the subsoil and the flatness of the ground, had heretofore caused the partial failure of all the attempts at oak planting, in spite of the excellent climatic

conditions of the district, simply because during the Spring months the solar heat necessary to the proper germination of the seed was altogether dissipated by the water that covered the ground. It was already late in May and sometimes the middle of June, when the soil rid at last of water, received a sufficiency of heat for the needs of the young plant. When the acorn would germinate, though with difficulty, July came with its high temperature, the young seedling, unable to cope with the fierce heat of the sun, perished from weakness and lack of growth. As to pine, less difficulty was encountered. This species of tree could vegetate almost the whole year round, and in spite of the heat of Summer and other serious drawbacks, managed generally to hold its own, yet not without great suffering. Having commenced its growth in May or June, it was, of course, far less developed than if it had already commenced in March to enjoy the solar heat. Certain places there were, covered with water up to midsummer where the seed never did germinate. So that in the midst of the pine plantations hitherto raised in the undrained "Landes," among sickly and yellow trees struggling each Spring with the water for their necessary heat, many openings were seen where pine never had succeeded in growing, and where all the expense of tilling and planting had been utterly lost.

Planted, however, in ground so drained that the water merely passes through the soil, acorns and pine seeds have been able to germinate in March, favored both by the Spring rains that here merely irrigate the soil, and by the sun, whose heat, already considerable, is no longer dissipated, in July the young plants, whose roots have rapidly extended through the loose and light soil, are deep enough and strong enough to stand the heat of the sun and to resume early the following Spring their active and normal growth.

It is a remarkable though easily anticipated fact that in those low bottoms where pines could not grow and seeds were drowned, draining has been followed by a far more active development of vegetation than anywhere else. These places were naturally, every winter, central points to which vegetable detritus, animal substances, and the droppings of sheep were carried by water; so that those very portions of land, formerly lost and useless, have become by the draining process the most fertile in the whole district.

Having, during the fall of 1848, carried out the system of drainage above indicated, through the piece of property we had selected for that purpose, we put in, about March, 1850, a crop of pines and oaks after a simple turning up of the soil, the total cost of which did not go beyond 30 francs per hectare ($6.00 per 2½ acres=$2.40 per acre).

Such were the immediate results of the planting that, the next year, numerous land-owners adopted the same plan and obtained identical success.

The General Life Insurance Company purchased a lot of 3,200 hectares (8,000 acres) close by the 500 (1,250 acres) which we had first drained and had similar improvements effected, after requesting of the government the aid of the civil engineers for the study of the drainage question. This aid was further granted gratuitously to all the land-owners that chose to try draining their lands.

NATURE OF THE WATER-SUPPLY.

Aside from the causes of unhealthiness and sterility appertaining to the soil, there existed in the "Landes" another factor far more pernicious to the health of the inhabitants and animals of the country; we refer to the noxious character of their water-supply.

This was a difficulty, the overcoming of which was one of the chief desiderata; until the inhabitants and cattle were duly supplied with a pure and healthy beverage it was useless to expect in that country the increase of population which alone could develop the capabilities of the soil.

As we mentioned before, there is not a living spring over the entire plateau of the "Landes;" the only water obtainable is derived from a general layer that underlies the *aliotic* stratum about 1 m. 20 (4 ft.) below ground. Thus a well in that region is but a hole bored through the alios and communicating with the layer of water placed immediately underneath.

This layer consists of the first rainfall of autumn; this water, after washing out the soil and carrying down all the vegetable and animal detritus in its way, penetrates through the interstices, numerous enough, of the *aliotic* stratum and comes to rest within the sand-bed below. There it remains, charged with organic substances, chief of which is vegetable albumen.

This water is of a yellowish tint and presents an acrid taste; no vegetation, no rolling on the sand or gravel can purify or air it as is the case with running water. Fur-

thermore, being so near the surface of the ground, it is ice-cold in winter and lukewarm in summer.

Water of this kind charged with nitrogenized products, the result of the putrefaction of vegetable albumen, is generally good for land irrigation, and the ease with which it can be obtained at any point of the "Landes," in summer, by making a simple hole four feet deep, is an element of great importance and value for the cultivation of certain articles, especially in the production of the higher class cereals, which is sure to advance at a rapid rate with the future increase of population.

* * * * * * * * * * * * * *

Under the bed of sand containing the water there are strata of clay and marl, under which undoubtedly water will be found purer than that above; however, a few borings some sixty-five feet deep that we made at different points, have failed to strike these strata, and the geological study of the country makes it probable that those calcareous and argillaceous layers are too far below the surface for wells to be carried down and through them.

However, as the impure surface water gradually goes down and filters through the sand, it leaves behind more and more its suspended organic substances, so that, taken say at a depth of twelve feet, it is found much purer than at the surface. If, further, this water taken at twelve feet depth, is made to filter through a heavy artificial stratum of marl and clay gravel, it will rid itself completely of all organic matter and come perfectly pure out of the artificial stratum.

FILTERING WELLS.

In order to carry out this idea, we have constructed wells only twelve feet deep, so as to reduce the expense as much as possible. The resetment has been so cemented as to be impervious. Water comes in only through the bottom, which is covered besides by a 20-inch thick layer of clay, gravel, and limestone fragments, left from the cutting of the stones for the resetment. The water that issues from this layer remains a few days whitish, but it soon becomes clear again and is found entirely free of all organic substance. The following analysis will show that the water of ordinary wells holds as much as 34 milligrammes of organic matter per litre (½ grain to quart), while that of the filtrating wells holds but 2 mil. (.03 gr. to quart). Water charged with 34 mil. (½ gr. to quart) of organic matter is undoubtedly unhealthy, while the other may be considered as drinking water of very fair quality.

ANALYSIS OF THE WATER.

	Filter Wells.	Old Wells.
Carbonate of Lime	0.107	0.108
Sulphate of Lime	0.056	0.018
Chloride Sodium and Calcium	0.038	0.084
Silicate and Oxide of Iron	0.011	0.010
Organic matter	0.004	0.034
	0.216	0.254

Similar wells have been constructed in all the townships of both departments of the "Gironde" and the "Landes," and we will show further on that they have been one of the chief causes of the sanitary improvement of the country.

DEVELOPMENT OF THE FIRST CROPS OF 1849.

In 1855 the total area of the "Landes" drained and planted since 1849, according to the same process, reached already a figure of 20,500 hectares (50,000 acres).

As regards the planting done in 1849 on our drained land, the growth of the pines and oaks was such that after five years they measured an average height of 11 feet, with a circumference of about twelve inches close to the ground.

These results appeared so remarkable that a general inspector of agriculture, who had already made several unsuccessful attempts in the district, deemed it a duty to ship a few of those trees to the world's exhibition, at that time open in Paris, in order to lay them before the international committee charged with the examina-

tion of the attempts at forest raising made on the wild lands of France and the neighboring countries.

This committee was composed of Messrs. Milne-Edwards, Geoffroy St. Hilaire, Brongniart, Decaime, members of the Institute; Focillon, Vicaire forest commissionsioner, and several foreign agriculturists.

Such was the impression produced by the committee by the result obtained in the "Landes," as explained at length by ourselves, that they resolved on investigating the matter themselves.

Here is an extract from their report:— * * * * * * * *

"The Committee has, therefore, seen, with the highest satisfaction, an exhibitor who, hoping almost without hope, has found in the study of the soil and of the climatic conditions of that sandy desert the germ of a new system, and has carried it out regardless of cost or obstacles. Where so many gifted with far greater resources had completely failed, he has achieved in a few years a success the future of which is all but assured, and has solved at the same time a problem of national interest.

"Under No. 229 of the Imperial Catalogue, Mr. Chambrelent, civil engineer in the Department of the 'Gironde,' exhibits young trees of the maritime pine and white-oak species, grown from seeds planted in 1850, on a piece of property located in the 'Landes,' and according to a method originated by the author. * * * These weighty reasons induced the Committee to order a local investigation as a basis for a detailed report; Mr. Kreuter, an Austrian engineer, was entrusted with the mission. By the end of September his labors were completed and his report submitted to the Committee."

The result of the examination by the Committee was:—

1. That the fine growth of the trees was equally remarkable over the entire surface of the drained lands.

2. That the draining method applied to those lands was as simple as it was cheap.

3. That the same method was applicable with equal facility to the whole extent of wild or unhealthy lands still existing in that part of France, and would render them more or less valuable.

The report mentioned besides all the work done since 1849 by those land-owners who had imitated the example given them, and called attention to the great advantages which would follow the extension of those works over the whole country.

Unfortunately, these works could be carried on only on lands close enough either to the rare little brooks that rise near the boundaries of the plateau, or to the ditches of the public highways which led to the brooks.

In order to secure the entire drainage of that whole surface, a grand general plan was necessary, comprising large canals intended to receive the waters of all the secondary ditches to be opened at various points.

This could not be done without the intervention of the State, which alone had authority to order and design an operation which was to be developed over such a large extent of country.

This State intervention was called for, besides, by the duty imposed upon it by law of abating nuisances and conditions noxious to health; at the same time it was the proper policy of the inhabitants to accept it willingly, since thereby their lands were for a small sacrifice of money to be rendered healthier and considerably more valuable.

Still another circumstance rendered State intervention necessary. About one-half of all the wild and malarial lands was generally held in fee simple by the towns without admixture of special or ancient rights of village or district, which habitually raise such obstacles to all plans of land improvement.

The State, as guardian of these towns, was bound to initiate for and even to impose on them the execution of works which, while being essential to the general welfare, were intended to confer on them such great advantages.

By virtue of the law of 1807, the work of draining could be made compulsory; but that law, besides being very complicated and difficult of application over such extended ranges, could not have been construed so as to compel the putting in of crops in the new lands. But the advantage of doing so immediately after the draining, was considered of such importance as to lay on the State the obligation to provide for it even at the risk of temporary sacrifices.

The object in view was so great, and the probable expense so modest compared with the expected results, that the State, convinced by the mass of testimony at hand, finally decided to introduce a bill for the sanitary drainage and agricultural redemption of the "Landes" of Gascony.

This bill became law on the 19th of June, 1857, and was immediately applied. Its results have reached far beyond all anticipations.

We will now examine the dispositions of the law and give an account of its application and the results obtained.

CHAPTER II.

Law of the 19th of June, 1857.

The principle of the law of June 19th, 1857, is as follows:—

"The town lands of both Departments of the 'Gironde' and the 'Landes,' will be drained and agriculturally reclaimed at the expense of the towns themselves.

"Wherever this is impossible, or in case a town refuses to have the work executed, the State will have it done at its own cost, and will re-imburse itself for the capital expended as well as for the interest thereof, out of the proceeds of sales of timber and other products of said lands."

The law, it is clear, did not apply to private property, but as already noticed by the committee of 1855, a large number of land-owners had already followed the example given them; and if the proportion of private lands drained and cultivated since 1849, had not been larger, this was principally caused by the extensive ranges of town lands among which the parcels of private property happened to be enclosed.

Either from apathy or interested motives on the part of municipal councilmen, owners of herds of sheep allowed to roam freely over those lands, the towns had as yet failed to do any work whatever; they merely had during the last few years commenced to sell certain parcels of property the value of which had increased of late.

The owners of property enclosed in the commons were therefore waiting for the opening of the main canals that were to receive their own drainage water as well as that of the commons; until then, they could neither open ditches nor put in crops.

Further, the law provided that the country roads necessary for the improvement of the lands to be drained, would be constructed at government expense. Those roads were to be lined by two large ditches which thus would furnish the land owners with means of escape for their drainage water.

No one doubted, therefore, that as fast as these roads and other works prescribed by law were executed on the town lands, the private land-owners would rapidly follow with their own improvements. This expectation has been most completely realized, as will be seen further on.

However, when the bill was introduced in the legislative chamber, two objections were raised against its provisions.

In the first place, several members observed, that over the surface of France there were many other wild lands awaiting improvement, and that there was, in their opinion, no reason why the State should favor the "Landes" of Gascony in preference to any other district. * * * * * * *

[Because, however, no other district presented so homogeneous and extensive an area (1,600,000 acres), forming an interior Sahara most fatiguing to travelers who visit the south of France or go to Spain; because this whole department could all be reclaimed by a single process; because the reclamation of this vast area was thus a matter of national importance; and because of the certainty and the greatness of the results to be attained,—it was decided to give preference to the "Landes." The report continues as follows:—]

Another objection to the bill was the considerable expense that the State might have to incur. The total extent of commons in the "Landes" of both departments measured some 750,000 acres, and at an average of 20 francs ($4) per acre, the cost to the government, in the event of all the towns refusing to pay for the work, would have reached a figure of 15,000,000 francs ($3,000,000).

As to this, we remarked that this sum of 20 francs ($4) per acre had been expended by us in order to drain and plant the first and most difficult lot, but that one-half of that sum would scarcely be required when the process was carried on over large extents of surface.

We added that in our opinion the towns would never consent to give up their commons, and that sooner than let the State own them temporarily, the municipal councils would without hesitation have the improvement made at their own cost, and raise money to cover expenses by selling enough parcels for that purpose. We further claimed that whatever outlay the State found itself forced to make would never go beyond the sum of six millions of francs ($1,200,000).

This figure of six millions francs ($1,200,000) was incorporated in the law as the maximum responsibility assumed by the State.

We show further on that these expectations were far surpassed by the actual events. All the towns without exception have paid all their expenses, and not a cent has been touched of the six million francs ($1,200,000) granted to the State for the execution of the work.

No law has ever been more completely accepted and carried out by all concerned, not a single town has hesitated to assume its share of the expense. * * *

CHAPTER III.

Application of the law of June 19, 1857.

Immediately after the promulgation of the law the municipal councils of all the towns possessing commons were called upon to decide whether each individual town was ready to execute the work of draining and planting prescribed by the law, and willing to assume the cost.

The area of wild and unhealthy lands owned as commons by the towns in the department of the Gironde (divided among 52 townships) measured 107,811 hectares; and the corresponding lands in the department of the Landes (divided among 110 townships), 183,714 hectares; total (divided among 162 townships) 291,525 hectares (or 728,812 acres). Besides these town lands, a much larger extent, some 350,000 hectares (875,000 acres), belonged to private individuals.

An area of 25,000 hectares (about 63,000 acres) had already been reclaimed and planted since 1850, prior to the law affecting the towns, and the execution of that law was sure to decide all the other property holders, who only waited for the town works in order to commence their own.

The municipal councils unanimously declared themselves ready to assume the charge of all the works, and stated their intention to cover the cost out of the proceeds of the sale of a certain portion of their lands; they all requested, besides, that the specifications of the scheme be laid out and the works executed at their own expense by the civil engineers attached to the hydraulic service of the Department.

WORK OF DRAINING.

The drainage scheme was immediately elaborated and submitted to the examination of the municipal councils.

This scheme comprised the opening of main canals to receive the water, and secondary escapement ditches to be opened afterwards to insure the complete drying of the lands to be improved.

The laying out of those main canals, to be cut out over a nearly flat ground and through sandy soil, demanded long study and presented many difficulties. The whole country had to be carefully surveyed; as we have remarked before, the slope of some portions of it is only ½ of one per thousand (6 inches in 1,000 feet).

In calculating the slope of the canals we had to avoid too slight an inclination, which would not have been sufficient to give motion to the water; likewise too steep a declivity was also to be avoided, on account of the sandy character of the soil. The slopes have been determined so regularly along the entire course of the canals that the cost of keeping them in repair since they were opened has been but a moderate source of annual expense.

The main arteries had also to be so arranged in their mutual relations as to serve in an equally advantageous manner all the townships across which they ran, and the inhabitants of which were to be taxed pro rata to pay the cost.

Finally, as the various parcels of town lands, though covering large areas, were still separated by private pieces of property, which had to be crossed by the projected canals as well as the commons, it was necessary to obtain the owners' consent, not only so as to avoid paying them damages, but also to obtain their assistance and help, which they in justice were bound to give, considering the advantages they were to derive from the work.

Thanks to the favorable dispositions of the land-owners and of the municipal councils, thanks also to the zeal of the prefect of the Gironde, M. de Mentque, to whom a good share of the result is due, all difficulties were overcome.

Every scheme was successively adopted by the municipal councils, and rights of way granted by all the private proprietors save one, to whom an indemnity of 991 francs ($198.50) had to be paid for the privilege of running a canal through his property.

The average width of the main canals in the Department of the Gironde was 13 to

15 feet, measured on the bottom, and their total added length 2,196 kilometres 882 meters (1,400 miles).

The canal of the coast marshes, that extends from the pond of Laconan to that of Languarde, and which had to be opened among perennial marshes, is 40 feet wide at bottom, with a slope of 25 per thousand along a line of 10,198 metres (8 miles).

The canal running from the pond of Hourtin to that of Laconan, also opened among marshes where the workmen had to work constantly in the water, is 22 feet wide and 8,326 metres long (about 6 miles).

These two canals were intended to receive the entire drainage of a water-shed area of 81,000 hectares (200,000 acres), in which were many townships to be drained; and the conditions of the work, which differs from that carried out elsewhere, will be the subject of a separate chapter of this report (Chapter 5.)*

While we were busy elaborating the schemes, the municipal councils were devising means to obtain the funds necessary to cover their respective shares of the cost. For this, simultaneous sales were negotiated in each township, a difficult operation which required special care in order to overcome all obstacles, while protecting entirely the interests of the towns.

As soon as the plans and specifications were definitely agreed upon and the funds got together by the towns, the work was divided up and immediately commenced.

In 1862 three main draining schemes had already been fully carried out in the department of the Gironde, and twenty-two others were sufficiently advanced to give us hopes that the entire work would be completed in the early months of the following year.

* * * * * * * * * * * *

In 1865 the draining was entirely completed and the general council at its sitting of September 2d, after taking cognizance of the results, added to its proceedings a vote of thanks for those to whom their realization was due. The expense of drainage in the Gironde amounted to 574,108 francs, and in the Landes to 319,362 francs; total for both departments, 893,470 francs ($178,694). In the document relating to the law the maximum cost of drainage had been estimated at 12 francs per hectare (4 francs, or 80 cents per acre).

It is clear that we have remained considerably below this figure; if we divide the sum of 574,108 francs by the total area of the township lands, we only get an expense of 5 francs (55 centimes) per hectare (44 cents per acre); that is less than half the maximum estimated cost.

This reduction is owing to two causes:—

First, we must call attention to the fact that certain townships possessing but few parcels, or situated on the highest part of the plateau, have been found not to need any main canal for the reception of their drainage water.

On the other hand, we have endeavored to utilize as much as possible all the ditches of country roads, of highways and turnpikes, both constructed and projected. In regard to the latter, the ditches have been opened first, pending the completion of their construction.

In the Department of the Landes, the reduction seems larger still, because the total expense is less although the area is larger. This is explained by the circumstance that in the "Landes" the lands for sale have not been included in the scheme for draining. The work in the latter has been reserved for the purchasers.

Accordingly the cost of 319,362 francs ($63,872.40) only covers an area of 60,956 hectares (150,000 acres) at the rate of 5f 25 per hectare (42 cents per acre). This however has prevented the perfect uniformity and correspondence of the work on the lands still belonging to towns and those that had been sold. Furthermore, the Department of the Landes, selling undrained lands, has realized far less capital, and the difference is even greater than the previous cost of draining would have been. Thus the Department of the "Gironde" has sold, on an average, its drained lands 20 francs ($4.00) higher than the other Department, although the draining cost but 5f 50 (44 cents per acre) or thereabouts.

At any rate, before commencing the work, the towns had already realized by selling part of their lands, as we already stated, the entire sum necessary to cover all the cost of draining, and all the work has consequently been done without government aid; the six millions francs ($1,200,000) placed by law at the disposal of the State for that purpose, in the event of resistance on the part of the towns, have remained intact. Thus the hopes we gave, at the time the bill was discussed, in holding the belief that not a single town would require coercion, have been realized. The result is as complete as could be desired.

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* Omitted in this translation.

In proportion as the draining progressed we turned our attention to the work of planting in those lands that had not been sold to pay expenses.

But outside of this work, the foundation of future wealth in those districts, there were improvements of another nature, no less important both from a moral and a material standpoint, which it behooved us to introduce in the country.

WORKS OF MUNICIPAL INTEREST.

Several townships had no town hall; municipal affairs were transacted in some room rented by the town from the chief inn-keeper; schools or parsonages existed hardly anywhere. As to churches, most of them were old tottering concerns unworthy of the purpose they were intended for.

Encouraged by the rise in value of their drained lands, the municipal councils, under administrative impulse, finally consented to sell additional parcels of land to an extent sufficient to procure them the means of supplying their towns with the municipal buildings and religious edifices they were in need of.

We have carefully ascertained for each town, the area of lands disposed of by sale, the money realized and the use made of it. Our figures, from the great care and pains taken, are rigorously accurate. The result of the official census shows that the proceeds of the sale of town lands in the Department of the Gironde reached the sum of..... francs 5,523,001
And in the Department of the Landes, the sum of..... 7,908,941

Total..... francs 13,431,942
(=$2,686,388.40)

The following schedule shows the various works of public utility executed in the 162 townships of the "Landes" of Gascony, as a result of the application of the law of June 19, 1857:—

	Francs.
1. Drainage works costing	893,470
2. Putting first crops in the lands	681,811
3. Construction of new churches and repair of old ones	2,391,503
4. Construction of new parsonages and repair of old ones	677,053
5. Construction and repair of school-houses and town halls	1,636,372
6. Subsidies, subscriptions, and special contributions for the development of country roads and highways	1,987,211
7. Sundry expenditures, construction of wells of drinking-water, transfer of cemeteries outside of towns and villages	811,776
8. Township funds invested in government bonds	4,352,746
Total equal to the proceeds of sales	13,431,942
	(=$2,686,388.40)

This statement, in the opinion of the General Council of the Gironde, may be quoted as one of the brightest pages in the history of progress and civilization, in a district which, twenty years ago, was the most wretched and the poorest portion of the French territory, and which to-day may be considered one of the wealthiest and most prosperous.

WORK OF PLANTING.

While realizing these improvements as useful to the moral and intellectual development of the inhabitants as to their physical welfare, the towns in the Gironde have planted at a cost stated above—

	Hectares.	Acres.
	23,717	= 58,000
And those of the "Landes" an area of	50,422	=125,000
Total	74,139	=183,000

* * * * * * * * * * * * *

RESULTS OF THE PLANTING.

As to the lands already planted, the results have been as satisfactory as could be expected; everywhere a forest vegetation of the most vigorous kind is developing itself from year to year and excites the wonder of all the travelers that visit the district.

Between 1865 and 1870 a few serious accidents have taken place, caused by accidental fires in the young woods. Although these fires have become less and less in num-

ber since 1870, they constitute a real danger. The administration is now devising means to efficaciously prevent them and framing a bill to that effect.

In order to ascertain the increase in value of the planted lands, we have, in each township, taken a census that illustrates this increase since the first crop of 1857.

The figures of our table are the result of information obtained from the mayors and the inhabitants and from the ascertained prices paid for the lands last sold. But these prices are generally too low; owing to a depreciation almost imaginary, and more fictitious than real, which has been brought about by the prevalent fear of fires.

Putting these fears out of the question (and it is to be hoped that they will be allayed some day by the passage of the projected law), we are warranted in adding 25 per cent to the prices which have been given us.

At any rate, on the basis of the actual depreciated prices, the value of the town lands, from the census made in each and every town, reaches for the Department of the Gironde the sum of..... francs 30,955,700
For the Department of the "Landes" the sum of..... 49,308,900

Total..... 80,264,600
(=$16,052,920)

Calculated on the same minimum basis, the value of 350,000 hectares (900,000 acres) of private land existing before 1849, and which have all been drained and planted, reaches a figure of..... francs 125,000,000

Total actual value of the "Landes" of Gascony..... 205,264,600
(=$41,052,920)

We must add that this value, already much inferior to that which the lands would possess but for the depreciation caused by fires, increases every year at a rapid rate, corresponding with the development of the young woods.

CHAPTER IV.

Results of the Law of June 19, 1857, from an Agricultural Standpoint.

In its report to the Legislative Corps, the Commission of 1857 gave as their opinion that the "Landes" of Gascony planted in pine, brought after a certain time a net income of about 33 francs per hectare ($2.64 per acre) which "increased every year, and that after a term of 70 years, the forest having reached its full development, would possess a value of no less than 2,000 francs" ($160 per acre). The Commission thus recognized the fact that the law would in that time give rise to a wealth of forest valued at nearly one thousand millions of francs ($200,000,000) and spread over the most sterile and ill-favored portion of France.

This estimation of the commission becomes verified more and more with each new planting; and we may even say that it falls short of the reality.

Some feared that one effect of planting trees over such an extensive range of country would be a fall in the price of timber, the more so from the fact that the cost of resins, after reaching a pretty high figure during the American war, has come down considerably since.

Far otherwise has it been; in accordance with an economic principle easy enough to understand, the abundance of timber produced has led the owners to seek new markets for it and has given rise to so many new forms of industry that in spite of the enormous production, not only have the prices risen on account of the more numerous markets, but even the young saplings, cut off during the first years in order to thin out the forest, have been sold without difficulty, for the first time.

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In order to convey an idea of extent of the timber trade of the Landes, we give the official figures published by the Southern Railroad Company, showing the amount of export from those stations where the forest produce of the country is shipped. This amount for 1875 is 357,719 tons, and in 1876, 453,888 tons. To these already considerable figures we must add all the timber that reaches Bordeaux otherwise than by rail, that is, by the national highway from Belin to Bordeaux, the Departmental road of Laconau, and all the roads that center in the metropolis; finally all that is floated down the Adour.

This latter is less considerably than the railway traffic, but it is still important enough, and its proportion to the other is about 25 per cent.

At any rate, the official tonnage of the Bayonne railway shows an increase of 96,169 tons for the year 1876 over the number, sufficiently high, of the preceding year.

This increase is sure to go on at a more rapid rate for the following years, because

of all the planting done since 1857 only one-fourth or thereabout has commenced to pay, and every year the paying portions will increase more and more. * *

Lastly, besides the exportation of timber, as such from the Landes, the abundance of pines in the country has given rise to a peculiar and remarkable industry, the fabrication of paper paste of the pine wood itself.

A large factory has been established at Meios from which most paper mills in France, specially that of Angoulême, draw pastes of a shining whiteness and a superior quality, made out of cellulose.

The Meios factory consumes about 5,000 tons of wood per year, and ships to Angoulême and other paper mills a thousand tons of dry paste.

This quantity, 5,000 tons of wood, is not large considering the immense quantity of pine timber exported now-a-days from the "Landes." On the other hand, this is a new business in the country and we cannot predict its future; if it should succeed it is quite possible that other factories may be soon established in the "Landes" and contribute to increase the wealth of the country.

We must state that following on the industrial development brought about in the Landes by the cultivation of the soil, a new progress has taken place which may produce great results in the future.

Heretofore no one had succeeded in utilizing for lighting purposes the essential oil derived from the pines, but now a new industry is just being developed; important discoveries lately made render it practicable to so utilize the oil of turpentine as to obtain from it a light superior to that of all the other oils and cheaper than petroleum itself.

We have ourselves tested this new mode of lighting and are convinced that it will render great services some day.

All these shippings of timber result from the process of successively thinning out those plantations which have not yet attained the age of 25 years.

After 25 years, the plantations begin to furnish products of greater importance and value. Small framing timbers can already be cut, and especially telegraph poles 20, 25, and 32 feet high. These poles, injected with sulphate of copper, according to the Boucherie process in several establishments spread through the country, are in demand all over France and even abroad.

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OAKS.

Besides the plantings of pines, of which we have sufficiently treated, oaks have also been planted in the drained "Landes," but the area so covered is comparatively very small.

These plantings have given much better results than those of pines; they have not been extended further because they necessitate a more costly preparation of the soil, and require particular care during several years after the planting. In view of the immense ranges to be brought under cultivation, it was thought best to adopt the most rapid and economical means of attaining the object aimed at. But it will be undoubtedly advantageous for the country to develop more and more the cultivation of the oak.

The jury at the agricultural fair of the Gironde in 1876, after taking cognizance of the condition of the oak plantings done in the "Landes" in 1850, declared them to be the finest and the most rapid of growth they had ever seen, even in ground of far more value than the "Landes."

An important fact, which enhances the worth of the results obtained from the cultivation of oaks in the "Landes," is that, in spite of their hasty growth, these trees yield timber of a superior quality. Contrary to the general rule which applies to the growth of woody tissues, in the case of the oak grown on drained land, the precocious development of the tree does not appear to impair the quality of the wood. This important fact is confirmed by the experience of several ship-builders, and was ascertained long ago by a chief inspector of naval constructions, Mr. de Bonnard, after a local investigation conducted by specialists.

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CULTIVATION OF OTHER ARTICLES.

Although nearly the whole of the drained "Landes" has been turned into forests, still by their side other commodities of a higher class have gradually been cultivated in the neighborhood of houses built since 1857. These new crops cover as yet but a very small area, some 2,200 hectares (55,000 acres); but they begin to spread pretty rapidly, from the fact that the new forest industry brings daily an increase of population in the district. They consist in meadows, vineyards, rye-fields, and

vegetable gardens designed for the supply of the families as they gradually settle there.

Unfortunately this cultivation is limited and can increase only with the population and the supply of fertilizing material.

The population begins to increase pretty fast with the development of the wood trade. Cattle also increase in numbers, especially since most of the young trees have become large enough to dispense with artificial protection, and will after a time furnish manure enough for the cultivation of other articles. Then it will be practicable to develop this cultivation, and more particularly that of the grape vine along that belt of country which borders the Medoc district, and where wines of a certain value will undoubtedly be raised.

But there is no need of hastening this movement; the proprietors are spontaneously drawn to it, and in their present state of mind it is better to check the tendency than to encourage it.

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CHAPTER V.

[This chapter describes the engineering works executed for the purpose of providing a free escape to the waters of the coast marshes, and it is not of sufficient interest, nor does it have enough bearing on the main question, to require translation.]

CHAPTER VI.

Results of the law of June 19, 1857, with regard to the sanitary improvement of the country, and the moral and intellectual development of the population.

Besides the agricultural results of which we have spoken, the improvements of "Landes" have produced other results not less important in a sanitary and moral point of view. In proportion to the increase of the sanitary measures and the construction of drains, the fevers which had decimated the inhabitants diminished, and in 1865 they had so completely disappeared that it was declared by the physicians that "In this country, formerly so insalubrious, there is not more sickness than in latitudes more favorable."

Here is an extract from a report presented to the Consul General during the Assembly, September 2, 1865:—

"In regard to the public health, the results obtained have not been less satisfactory.

"In each of the reclaimed townships there has been estimated the births and deaths from the year 1855 to December 31, 1864. The result of this reckoning we give in the following statement:—

"From 1855 to 1858, the time when were felt the effects of the first workings of the sanitary measures, brought about by the isolated proprietors, the diminution in the number of deaths in proportion to that of births was at the rate of 14 per centum.

"From 1858 to 1861 this diminution was 27 per centum.

"Then from 1861 to January 1, 1865, during which period the work had produced so much more sensible effect, the number of deaths was in proportion of 44 per cent less than that of the births.

"The report of all the physicians of 'Landes' confirmed and explained these very remarkable official statements.

"The physician of the province of Castlenau, M. Laffort, who had under his observation the townships of St. Helene, Brach, Lacanau, Saumos, and the Porge, which were the sections where the (paludal, or malarious) fevers raged most fiercely, expresses himself thus in his report of the 28th of April of this year:—

"'To-day, in this country formerly so unhealthy, there is not more sickness than in latitudes more favorable.

"'This is true, that before the rendering healthful our plains every year, I needed about one kilogramme (27 ounces) of sulphate of quinine and other drugs; 100 grammes (2¾ ounces) is sufficient for me to-day.'

"Dr. Semiac, who practiced in d'Audenge, where we find the provinces of d'Ans, d'Audernos, Lauton, Beganos, and Mios, states results no less remarkable.

"'The paludal affections,' says the report of this physician (13th of July of this year), 'are but little more to-day in 'Landes' than in the healthiest parts of France. The unmistakable proof of this astounding result is as follows:—

"'Until 1857 I consumed at least one kilogramme (27 ounces) of sulphate of qui-

nine a year in my practice, not taking into consideration that which I ordered for sickness upon the railroad or at the custom house, at which I have the honor to be the attending physician. I have purchased during five years ½ kilogramme (13½ ounces) of sulphate of quinine, and I have some of it still.'

"All the reports of other physicians confirm these very gratifying statements of the hygienic state of the plains since the execution of these sanitary measures.

"The physician of the province of Salles signalizes especially the construction of filtering wells, as one of the principal causes of this happy result." We are able to produce the results of others, which have been obtained up to this year, 1865, and of those up to the 31st of December, 1876, which will confirm all that has been affirmed.

We have noted with religious exactitude in township after township, from 1856 to 1876, the number of deaths and births of each year.

We have essayed by indicating by two lines the fluctuations of the birth-rate and that of the death-rate, year by year. We have commenced at 1856, when for 1,000 deaths we have 1,080 births, and we have traced the corresponding lines of each year following. From 1855 to 1868 the number of deaths diminished considerably and in proportion to the execution of the work; and the number of births increased almost in the same proportion. From 1868 to 1869 there was a considerable increase of deaths and about an equal reduction of births. This variation, little felt by others, is explained by an epidemic of small-pox, which raged with violence in two Departments and which weighed upon Landes as heavily as upon the rest of the country. In 1870 the death line was raised considerably. It is the year of the war. This excess of mortality diminished in 1871; the effects of the war continued to be felt, but with less violence, and in 1872 the death line fell to the reduced figure it had before shown. The condition of affairs was still to be mourned, from the effect of the war upon the births. From December 30, 1870, to December 31, 1871, the reduction of births was yet larger than had been the increase of deaths in 1870. This excessive reduction of births in 1871 is easily accounted for when one reflects that from the month of July, 1870, to the first months of 1871 nearly all the able population of France was under the flag, whether in the active army or in the reserve, those in the reserve having all reached the age of 40 years. In 1872, however, the births, arrested for a time, increased to even more than the original figures; and in 1873 the increase of the population recovered the ordinary rate. We see thus how much the form of the two lines, which appeared at first sight so strange, explain (themselves) by this correct explanation, and prove exactly the statistics of the mayors. The variation of the two lines in 1870 and 1871 shows the positive proof of the improvement.

It was the active part of the population of Landes that was taken by the war, it is a proof that sturdy men had substituted themselves little by little in the place of the puny and stunted population which had existed before in the country. Another consequence of the promotion of health, agreeing with the other results very naturally and quite as remarkable, has been the great increase in the longevity of the people.

In calculating the mean life, after the number of deaths and the age of the deceased, the reckoning made in the provinces from 1855 to 1859 shows the mean life in these periods in Landes, before drainage to have been 34 years and 9 months.

The same statistics, from 1865 to 1869, and up to 1870, to avoid the error caused by the war, show the result to be 38 yrs. 11 mo. 19 days, or perhaps 39 yrs.

This mean life varies in France from 33 to 40 years, say about 37½ years. The mean life of Landes, which was formerly 3 years inferior to the average longevity of France, has not only attained that longevity, but surpasses it 1½ years.

This very favorable result is undoubtedly astounding. The sole cause of the unhealthiness was the marshy state of the soil and the impure water.

These two causes have disappeared; it is situated in the country, near the sea shore, and the sea breezes purify the air; on the other side are pine forests which have always been acknowledged as a cause that contributed greatly to the purifying of the atmosphere. It is now conceded that Landes in the conditions that we have stated, ranks to-day as one of the most salubrious provinces of France, as is declared by the physicians of the country and is shown by the figures that we have cited. There are still other facts, beyond the sanitary results properly said, which give an idea of the real progress of the country and the welfare which has been the experience of its inhabitants. After the official reports we give the Director of indirect contributions of Landes, the products of the Landes cantons, which from 1853to 1857 yielded a revenue less than 1,014,000 francs ($202,800). This has increased in the late years preceding 1870 to 1,382,000 francs ($276,400), an increase of 375,000 francs ($75,000) or in the proportion of 33 to 100. We have not profited beyond the year 1869 on account of the increase of new imports created since 1870. The increase of which we speak is due only to the natural development of the country

In recording, the progress has been more considerable still.

The receipts of the country which had amounted before 1857 to a sum of..... francs 465,000 (=$93,000)
has attained the sum of..... francs 964,000 (=$192,800)

Showing an increase of..... francs 499,000 (=$99,800)
Which represents more than double the figures of 1857.

The progress has been such under this revenue, that it has been necessary to make six new bureaus of registry in the cantons of Gabanret, Arjuzaux, Sabn, Mimizan, Parentis-eu-Born, and Castets.

Finally, we state that the results that we indicated have been very happy, the moral and civil development have progressed *pari passu* with the advancement of the products of nature. Previously to these works the unfortunate people of "Landes" often had for shelter only huts in the woods or open fields where the people lived in a sort of *pêle-mêle*, men and women, and where the moral degradation was sad to behold.

The construction of commodious and healthful stone houses has been, with the schools and churches, one of the causes which have greatly contributed to the moral and intellectual development of the people.

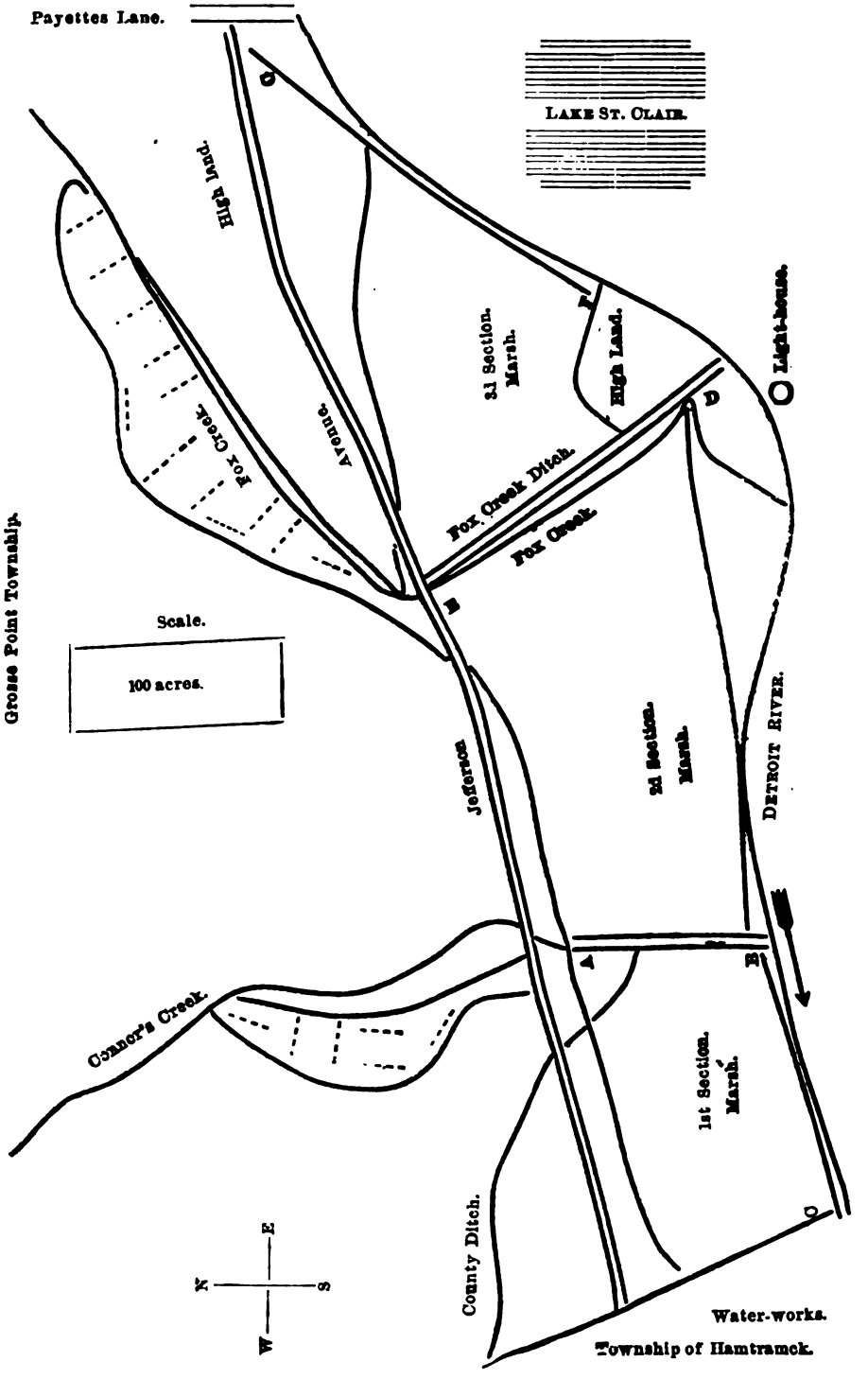
THE RELIEF OF "LE GRAND MARAIS," WAYNE COUNTY, MICH.

The low land just above the easterly limits of Detroit, known as the Grand Marais, lies wholly between Jefferson Avenue and the Detroit River. For many years it was considered not only of little value for any useful purposes, but on account of its miasmatic exhalations it has been deemed a serious threat to the sanitary conditions of the metropolis of this State. A plan has been adopted and put into execution which will in the course of the next twelve months result in the complete reclaiming of the entire Marais, and adapting it for either agricultural or manufacturing purposes.

The subject was one which long engaged the attention of Wm. B. Moran of Detroit, who concluded that but a few years would demonstrate that a large and growing city like Detroit could not afford to have such a large expanse of waste and unhealthy soil so near its borders. He became convinced that it could be reclaimed and that it should be reclaimed. He entered upon the work alone and unassisted, commencing by himself making a careful personal survey. In the course of a few months he was familiar with the topography of every square foot of the entire marsh. He then tested the geological structure by using at every square rod a long, hollow iron tube shaped very much like a butter-trier, and exhibiting in the same way the results of the testing. It was found that the borings were uniform in their results, showing the substratum to be first a black muck from 13 to 23 inches deep, then a clear white clay from 12 to 18 inches, then a beautiful and compact blue clay to a depth of eight feet. It was concluded that these were the components of strong dykes and that if the earth could be handled and thrown up into dykes the entire strip could be reclaimed. After mature deliberation it was determined that, notwithstanding the average level of the land was above the river, it was constantly kept wet by the wash from the Detroit River, and Fox Creek, and Connor's Creek.

Upon close examination of the two creeks it was found that they were too crooked, too long, and too deep to furnish soil enough for dykes by the usual process of creek-cleaning. Consequently the next step in the scheme was to determine upon the complete abandonment of the creek beds south of Jefferson avenue, and to construct two straight, wide, and deep canals, the first, A B (p. 259), 60 feet wide and 7 feet deep, tapping Connor's Creek at the point A and receiving its water at that point and carrying it straight to the river, and furnishing earth enough for a dyke on each side of the canal, 7 feet in height and twenty feet wide at the base; the second, E D, tapping Fox Creek at the

DRAINAGE OF "LE GRAND MARAIS," NEAR DETROIT.



point E, is a mile and one-fourth long, 30 feet wide, and 7 feet deep, with dykes on each side five feet high and 18 feet at the base. In this manner the work was divided into three sections, the walling in of each section being made complete by the beach-dykes, C B, B D, D F (a natural dyke), and F G. The cuttings from which the excavations are taken to form the beach-dykes are on the inside; and into these the rainfall will be drained and pumped out through troughs into the river by the aid of two wind-mills for each section. The dykes along the beach of course close the mouths of the two creeks, and these will in the course of one season completely dry up. The improvements on the new water-works property provide the extreme westerly dyke for the entire work, and the high land at Payetts lane furnishes the extreme easterly dyke.

Three steam dredges have been and are now engaged in this undertaking.

The amount of land that will be reclaimed will not be less than three thousand two hundred and fifty acres, at an expense not to exceed three dollars per acre.

THE "THOROUGHFARE" AT GROSSE ISLE, WAYNE COUNTY, MICH.

The following report relative to the "Thoroughfare" at Grosse Isle is from a resident in the vicinity:—

The "Thoroughfare" on Grosse Isle is an old river channel extending diagonally across the island from N. E. to S. W., about 3¼ miles in length, and averaging about 300 feet in width. It is about 7 feet along the middle of it to hard bottom. It is now a marsh. The surface about half way between the ends is one foot above the ordinary level of the river. The water of the river alternately flows in and out of the two ends, especially the lower end, as the river level changes with the influence of the winds in raising or lowering the waters of Lake Erie. In the unusually high water of two or three years ago I think there was frequently a current of water from the river running through the whole length of it. The banks rise with a rapid slope on both sides to an average height of from 10 feet to 15 feet. No streams enter it. The surface drainage into it from each side does not exceed one-quarter of a mile. If it were now, as formerly, an open river channel, it would be a beautiful feature of the island, and its banks would make delightful sites for residences.

The project has been entertained of dredging a channel through it wide enough to furnish sufficient earth to elevate the rest above water and render it capable of cultivation. The great expense of such an improvement renders it for the present impracticable; a channel 30 feet wide would cost over $20,000.

But it may be very easily and cheaply reclaimed so as to be rendered fit for cultivation by diking out the river at the two ends and keeping the water pumped out with one or more windmills. The diking to be done would not cost over $300 unless sheet piling should be found necessary to protect from muskrats.

Our friend Farrand Henry examined the ground last Summer, and pronounced the diking and pumping plan perfectly feasible, and estimated the cost of the work, done in a most substantial and permanent manner, at less that $4,000. The amount of land which would be reclaimed would be about 130 acres. A ditch along the middle of it is included in this estimate. The Summer work for the pumps would be so light that I think a small stream of water might be let in at the upper end to run through the ditch to the lower end and then be pumped out, thus furnishing water for stock. The land reclaimed would be very rich muck, and as it would be, after the decay of vegetable matter in it were perfected, considerably below the river level, it could be irrigated from the river whenever irrigation was required.

This improvement will probably be impossible without some legislation, on account of the nnmber of proprietors. The only practicable way is to raise money by assessing lands benefited, according to benefits, both for the cost of making and for the subsequent annual cost of maintaining the improvement. This legislation cannot be obtained before next Winter.

While I am earnestly in favor of the improvement, I don't think this thoroughfare is as injurious to health of the residents of the island as is generally supposed by outsiders; because the middle and most objectionable part of it is distant from habitations and bordered by forest. This forest, however, is being cut down, and the thoroughfare, being more obstructed every year, and the wise thing for the islanders undoubtedly is to reclaim it as soon as possible.

RELATIVE TO

NOTICES OF DISEASES WHICH ENDANGER THE PUBLIC HEALTH;

DUTIES OF

HOUSEHOLDERS, PHYSICIANS,

AND OTHERS.

CIRCULAR

FROM THE

STATE BOARD OF HEALTH

OF MICHIGAN,

TO SUPERVISORS AND OTHER OFFICERS OF TOWNSHIPS,

TO PRESIDENTS AND OTHER OFFICERS OF INCORPORATED VILLAGES,

AND TO MAYORS AND OTHER OFFICERS OF CITIES.

CIRCULAR NO. 84,

Being a Modification of Circular No. 25, embodying one new law and one amended law on this subject.

[While this circular relates chiefly to the duty of giving notice of cases of diseases which endanger the public health and to the means of securing such notices, it is not to be supposed that the object of the law in requiring such a notice is secured merely by the giving of the notice. The board of health has duties to perform, immediately upon receipt of such a notice, in the way of taking measures to restrict the spread of the disease, which it is a great violation of public trust for it to neglect or postpone. Some of the duties of the local board and of the health officer, relative to the restriction and prevention of diseases, are treated in Circular 35 from the State Board of Health.]

HOUSEHOLDER'S AND PHYSICIAN'S NOTICES OF DISEASES WHICH ENDANGER THE PUBLIC HEALTH.

DUTIES OF SUPERVISORS OF TOWNSHIPS, PRESIDENTS OF INCORPORATED VILLAGES, MAYORS OF CITIES, AND OTHERS.

[CIRCULAR 34.]

OFFICE OF THE STATE BOARD OF HEALTH,
Lansing, Michigan, January, 1880.

To the Supervisor and all other Officers of Townships, the President and other Officers of Incorporated Villages, and to the Mayor and other Officers of Cities in Michigan:

GENTLEMEN:—Your attention is respectfully asked to the laws in this State relative to the *reporting of diseases which endanger the public health,* and to some of the duties of householders and physicians, supervisors and other officers of townships, health officers of cities and villages, and of the prosecuting attorney in connection therewith. Sections 1734 and 1735 (sections 43 and 44 of chapter 46), compiled laws of Michigan, 1871, are as follows:—

Householders to give notice of disease; penalty for neglect.

(1734.) SEC. 43. Whenever any householder shall know that any person within his family is taken sick with the small-pox, *or any other disease dangerous to the public health,* he shall immediately give notice thereof to the Board of Health, or to the Health Officer of the township [city, or village*] in which he resides; and if he shall refuse or neglect to give such notice, he shall forfeit a sum not exceeding one hundred dollars.

Penalty on physician neglecting to give notice.

(1735.) SEC. 44. Whenever any physician shall know that any person whom he is called to visit is infected with the small-pox, *or any other disease dangerous to the public health,* such physician shall immediately give notice thereof to the Board of Health, or Health Officer of the township [city, or village*] in which such diseased person may be; and every physician who shall refuse or neglect to give such notice, shall forfeit, for each offense, a sum not less than fifty nor more than one hundred dollars.

The foregoing sections refer especially to officers of townships; but the legislature of 1879 so amended section 1740 (section 49 of chapter 46, C. L. 1871) as to make all the provisions of said chapter apply equally to the boards of health and the officers and inhabitants of cities and villages in this State; enjoining upon them the performance of all duties required by said chapter, and imposing like penalties or forfeitures for the non-performance of such duties, except in cases where the charters of such cities and villages contain provis-

* See section 1740, compiled laws of 1871, as amended by Act No. 145, laws of 1879, printed herewith.

ions inconsistent therewith. The duty of giving notice of a case of a disease which endangers the public health is one clearly within the meaning of the law; and it therefore rests alike on inhabitants of cities, villages, and townships, and on all physicians practicing within the State. Section 1740, as amended by Act No. 145, laws of 1879, is as follows:—

Board of Health in cities and villages, who to constitute.

Duties of officers and inhabitants of cities and villages.

(1740.) SEC. 49. The mayor and aldermen of each incorporated city, and the president and council, or trustees of each incorporated village in this State, in which no board of health is organized under its charter, shall have and exercise all the powers and perform all the duties of a board of health as provided in this chapter, within the limits of the cities or villages, respectively, of which they are such officers. The provisions of this chapter, and the amendments thereto, shall, as far as applicable, apply to all cities and villages in this State, and all duties which are, by the provisions of this chapter, to be performed by the board of health of townships, or by the officers and inhabitants thereof, shall in like manner be performed by the board of health and the officers and inhabitants of such cities and villages, with a like penalty for the non-performance of such duties, excepting in cases where the charters of such cities and villages contain provisions inconsistent herewith.

In each of sections 1734 and 1735 a forfeiture is declared for neglect to comply with the requirements of the law. Act No. 157, laws of 1879, makes it the especial duty of the health officer of the city or village to give written notice to the prosecuting attorney of his county of every instance in which he may know or have good reason to believe that a penalty or forfeiture has been incurred by the neglect of any householder or physician in his city or village to give the notice required by law, of a case of disease dangerous to the public health. This act, omitting the title, is as follows:—

Health officer to notify prosecuting attorney of all failures to report.

What notice to state.

SECTION 1. *The People of the State of Michigan enact*, That it shall be the duty of the health officer of each village and city in this State, whenever he shall know, or have good reason to believe that any penalty or forfeiture has been incurred within his city or village, by reason of neglect to comply with section one thousand seven hundred and thirty-four [1734] or section one thousand seven hundred and thirty-five [1735] of the compiled laws of eighteen hundred and seventy-one, forthwith to give notice thereof, in writing, to the prosecuting attorney of his county, which notice shall state, as near as may be, the time of such neglect, the name of the person incurring the penalty or forfeiture, and, as near as can be ascertained, the name or names of persons sick with a disease dangerous to the public health, and not reported as the law requires.

The duty of the prosecuting attorney to prosecute, is specified in section 6855, compiled laws of 1871, printed on the next page.

As regards the execution of the law in townships, section 696 of the compiled laws of Michigan, 1871, provides that "The supervisor of each township shall prosecute, in the name of the people of this State, or otherwise, as may be necessary, for all penalties and forfeitures incurred within his township, and for which no other officer is specially directed to prosecute."

Sections 6852 and 6853 of the compiled laws of 1871, also relate to the duties of supervisors, and of all other township officers, concerning forfeitures; they are as follows:

Duty of supervisors to prosecute.

(6852.) SEC. 12. It shall be the duty of every supervisor, whenever he shall know or have good reason to believe that any penalty or forfeiture has been incurred within his township, which shall be recoverable by action before a justice of the peace, according to the foregoing provisions of this chapter, forthwith to commence and prosecute a suit, in the name of the people of this State, for the recovery thereof.

Duty of other township officers.

(6853.) SEC. 13. It shall be the duty of every other township officer, who shall know or have good reason to believe that any penalty or forfeiture has been incurred within his township, forthwith to give notice thereof to the supervisors.

It is thus plain that when a householder in any township, or a physician who treats a case in any township, does not comply with the requirements of

sections 1734 and 1735, by giving immediate notice of any disease dangerous to the public health, it becomes the duty of the supervisor of the township to prosecute him, "in the name of the people of this State," for the recovery of the forfeiture; and that in cities and villages the health officer, when he has reason to believe that a penalty or forfeiture has been incurred under the law quoted, must give notice thereof to the prosecuting attorney of his county, whose duty it is to prosecute, without delay, in all cases in which he has reason to believe that a penalty or forfeiture has been incurred by reason of the violation of sections 1734 and 1735 of the compiled laws. This duty of the prosecuting attorney is plainly stated in section 6855, compiled laws of 1871, as follows:—

Duties of prosecuting attorney.

(6855.) SEC. 15. In the cases mentioned in the last preceding section, and in all other cases where the prosecuting attorney shall know or have good reason to believe that a penalty or forfeiture has been incurred within his county, it shall be the duty of such prosecuting attorney, without delay, to prosecute for such penalty or forfeiture; and in all cases where any suit shall be instituted by the supervisor, as provided in this chapter, it shall be the duty of such prosecuting attorney, if requested by such supervisor, to attend to and conduct such suit on behalf of the plaintiffs.

The manner of commencing such action is specified in the same chapter (Ch. 216) of the compiled laws, from which the sections just quoted are taken.

In nearly all cases, epidemics can now be prevented by intelligent and active boards of health, if such boards receive due and timely notice of the first case, and first appearance of subsequent cases of all communicable diseases. In the interests of life and health it is, therefore, important that the laws requiring prompt notice to be given of the occurrence of diseases which endanger the public health shall be strictly complied with.

There are other reasons why these diseases should always be reported and carefully recorded. If this is done, such records will in time make it possible to learn much concerning such diseases and their prevention, which cannot well be learned in any other way.

The present law intrusts the guardianship of the public health with the local board of health in each city, village, and township, and this local board of health is largely responsible for the spread of any communicable disease within the township, village, or city; because the board is supposed to have timely notice of every outbreak, and to act promptly for the restriction of any such disease. If the local board does not receive such notices, this is, in some degree, its own fault; because the law requires each member of the township board, whenever he shall "have good reason to believe" that a forfeiture has been incurred "forthwith to give notice" to the supervisor, and it is the duty of the supervisor "forthwith to commence and prosecute a suit;" and in cities and villages, the law requires the health officer to give notice of all such forfeitures to the prosecuting attorney, who is required by section 6855 to prosecute for every such offense.

But "prevention is better than cure," and a wise forethought, with a small outlay, employed in placing before the people the requirements of the law on this subject and the importance of compliance therewith, may save a much larger outlay in the prosecution of such cases, and especially may it save the great expense which would be required in combating a communicable disease if such disease should once get a start in the community.

It is, therefore, especially desirable that the local board take such action as will lead to a general understanding of this subject by the people of the locality. As one means to this end, this State Board of Health recommends that every local board have printed and freely distributed within its jurisdic-

tion, blanks for the use of householders and physicians in giving notice of diseases which endanger the public health, on which blanks shall be printed sections 1734 and 1735, with such references to the requirements of sections 6852, 6853 and 6855, compiled laws of 1871, and to acts Nos. 145 and 157, laws of 1879, as will show the people the necessity for compliance with the first named sections.*

Such blank notices and sections of law may be distributed in various ways; but, in townships, if the supervisor distributes them at the time of making the assessment or at any other time, and calls attention to the fact that the law requires him to prosecute for non-compliance, it is believed that much good will result from the attention thus attracted to the subject, and that there will then be fewer occasions for the prosecutions which it is the duty of the supervisor to make if occasion requires. In cities and villages it is of still more importance that a thorough distribution shall be made in such manner as will attract the attention of people to this subject, and that the distribution should frequently be repeated.

Printed herewith is a form of Notice, recommended by this Board, having upon its back sections 1734 and 1735 and summary statements of sections 6852, 6853, and 6855, compiled laws of 1871, and acts Nos. 145 and 157, laws of 1879.

The first thorough distribution of these blank notices and sections of law throughout your jurisdiction will serve the very useful purpose of calling general attention to the subject, as will also public notices posted in conspicuous places; but in time the blanks may be mislaid; therefore, a constant supply of such notices should be provided for, from time to time, to be kept by the clerk and health officer, or even by each member of the local board of health, for distribution to physicians and householders whenever called for.

There should be no hesitation in enforcing this law when it is considered how important are the results in human progress which may be secured through a better knowledge of the diseases which endanger the public health, and how just is the demand which the law makes on householders and physicians that they give prompt warning of danger to their fellow beings. No humane person will refuse or neglect to warn a fellow-being of any danger, when by so doing the life of that fellow-being may be saved, and no other person's life endangered. Whenever we see a person unconsciously in danger, such as standing near a precipice, common sentiments of humanity dictate that we even incur risk to life in order to warn and save that person. In giving immediate notice of dangerous diseases, the householder or the physician does not risk life or limb, in many cases not even property, while the neglect to report may involve not only waste of property throughout the community by the losses which sickness always causes, but also may endanger the lives or future well-being of many neighbors and fellow-citizens.

Because of the importance of general compliance with this humane law, it is hoped that you will give this subject your earnest attention.

By direction of the State Board of Health,

Very respectfully,

HENRY B. BAKER, *Secretary.*

[Please preserve the circulars received from this office.]

* In order to make it certain that the expenses attending the work of the township board of health shall be duly provided for and promptly met, it is respectfully suggested that at the next township meeting a sufficient amount of money be voted (as provided in Act No. 212, Laws of Michigan, 1875), "for defraying all proper charges and expenses" by the board of health, to include expenses for distribution of public notices, for record books and blanks, compensation of the health officer, etc.

[Form of Notice recommended by the State Board of Health for the use of Householders and Physicians, in complying with sections 1734 and 1735, Compiled Laws of Michigan, 1871, and section 1740, C. L., 1871, as amended by Act No. 145, Laws of 1879. See over.]

*To the Clerk or Health Officer of the** .....*of*....., *County of* ....., *State of Michigan, as Clerk or Health Officer of the Board of Health:*

SIR:—The following persons, within the jurisdiction of your Board, have been taken sick with "diseases dangerous to the public health."†

NAMES OF PERSONS.	SEX.	AGE IN YEARS LAST BIRTHDAY.	NAME OF DISEASE.	TAKEN SICK.			WHETHER DIED, LIVING, OR RECOVERED.	DATE OF DEATH OR RECOVERY.		
				MONTH.	DAY.	YEAR.		MONTH.	DAY.	YEAR.

So far as known, the source.....of the contagious or infectious cause.....of the disease.....as follows: For case No. 1, it was.....

The residence of the sick persons above reported is as follows: Of case No. 1, it is at No..... .....street, ...; of case No. 2, it is.....

This Notice is given by.....

Dated at No.....street,....., 188....

* Insert the word *city*, *village*, or *township*.

† Includes Measles, Whooping-cough, Diphtheria, Scarlet Fever, Typhus Fever, Typhoid Fever, Puerperal Fever, Erysipelas, Small-pox, Cholera, etc.

Sections 1734 and 1735, Compiled Laws of Michigan, 1871, are as follows:—

(1734.) SEC. 43. Whenever any **householder** shall know that any person within his family is taken sick with the small-pox, *or any other disease dangerous to the public health*, he shall immediately give notice thereof to the Board of Health, or to the Health Officer of the township [city, or village*] in which he resides; and if he shall refuse or neglect to give such notice, he shall forfeit a sum not exceeding one hundred dollars.†

(1735.) SEC. 44. Whenever any **physician** shall know that any person whom he is called to visit is infected with the small-pox, *or any other disease dangerous to the public health*, such physician shall immediately give notice thereof to the Board of Health or Health Officer of the township [city, or village*] in which such diseased person may be; and every physician who shall refuse or neglect to give such notice, shall forfeit, for each offense, a sum not less than fifty nor more than one hundred dollars.†

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* See Section 1740, Compiled Laws, 1871, as amended by Act No. 145, Laws of 1879.

† Supervisors must prosecute for all such forfeitures; township officers must give notice to supervisor; prosecuting attorney to conduct suit if requested; see sections 6852, 6853, and 6855, Compiled Laws of Michigan, 1871. Health officers of villages and cities must notify prosecuting attorney of all violations of this section,—see act No. 157, Laws of 1879; the prosecuting attorney must prosecute for all such forfeitures incurred within his county,—see section 6855, Compiled Laws of 1871.

Notice of sickness of.....

Sick with.....

Reported by.....

Filed.....

[Blank Notices similar to this leaf may be obtained of W. S. George & Co., Lansing, Mich., for one dollar per hundred.]

RELATIVE TO THE WORK

OF

HEALTH OFFICERS

AND OF

LOCAL BOARDS OF HEALTH

IN MICHIGAN.

CIRCULAR NO. 35,

Being a modification of Circular No. 28, issued by the

STATE BOARD OF HEALTH

OF MICHIGAN.

CIRCULAR TO HEALTH OFFICERS.

[35.]

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH,
LANSING, MICHIGAN, January, 1880.

*To the Health Officer:**

SIR:—A number of Health Officers, appointed under Act No. 56, Laws of Michigan, 1877, which provides for a Health Officer in every township, city, and village in the State, have asked for an outline of the duties of this officer as a "sanitary adviser" of the local board of health. In order to respond to these inquiries more fully than by the letters and documents already sent, this circular is issued.

The constitution of township boards of health was changed in 1877, sections 1692 and 1693 being so amended as to provide that "in every township the township board shall be the board of health," and that "every township [city, and village†] board of health shall appoint and constantly have a health officer of the township, who shall, where practicable, be a physician and sanitary adviser, and an executive officer of the board." If no health officer is appointed "within thirty days after the annual township meeting," it will still be necessary to appoint or re-appoint one after that time, as in the case of a vacancy. Vacancies occur whenever the incumbent of an office ceases to be an inhabitant of the district, county, township, city, or village for which he was elected or appointed an officer,—see section 617, compiled laws of Michigan, 1871.

Before entering upon his duties the health officer should take and subscribe the official oath required by Sec. 1, Art. xviii. of the Constitution of this State, and file the same in the office of the clerk of the city, village, or township of which he is the Health Officer.

Some of the powers and duties of local boards of health are specified in Chap-

* A sufficient number of copies of this circular, stating duties of the health officer, are sent to enable you to give one copy to each member of your local board of health; and you are respectfully requested to do this, in order that the local board which controls your action and fixes your compensation may have the benefit of its suggestions as to the importance, nature, value, and extent of your duties.

†Section 1740, compiled laws of 1871, as amended by Act No. 145, laws of 1879, provides that "all duties which are, by the provisions of this chapter [46], to be performed by the board of health of townships, or by the officers and inhabitants thereof, shall in like manner be performed by the board of health and the officers and inhabitants of such cities and villages, with a like penalty for the non-performance of such duties, excepting in cases where the charters of such cities and villages contain provisions inconsistent herewith."

ter 46 of the compiled laws of Michigan, 1871. This chapter was constructed more particularly with reference to township boards of health, but section 49 of the same chapter (chapter 35 of the Revised Statutes of 1846, and chapter 46 of the compiled laws of 1871) as amended by the Legislature in 1879 makes it apply to cities and villages. That section as amended is as follows:—

Board of health in cities and villages, who to constitute.

Duties of officers and inhabitants of cities and villages.

(1740.) SEC. 49. The mayor and aldermen of each incorporated city, and the president and council, or trustees of each incorporated village in this State, in which no board of health is organized under its charter, shall have and exercise all the powers and perform all the duties of a board of health as provided in this chapter, within the limits of the cities or villages, respectively, of which they are such officers. The provisions of this chapter, and the amendments thereto, shall, as far as applicable, apply to all cities and villages in this State, and all duties which are, by the provision of this chapter, to be performed by the board of health of townships, or by the officers and inhabitants thereof, shall in like manner be performed by the board of health and the officers and inhabitants of such cities and villages, with a like penalty for the non-performance of such duties, excepting in cases where the charters of such cities and villages contain provisions inconsistent herewith.

It is believed that there is nothing in the charter of any city or village in the State that conflicts with the general law which requires the appointment of a Health Officer, either by the council acting as a board of health, or by a board of health constituted under some charter provision.

One great object in securing a physician as Health Officer was to enable each local board of health to lead and not, as too frequently heretofore, to follow the people in sanitary knowledge and action. As a rule our physicians are our leading sanitarians, and they know much better than other people what are the sources of danger to the public health in their several localities; and, as a rule, they know best how to avoid those dangers. It is therefore for the interest of the people to secure the benefits of that knowledge by paying for the services and advice of the best sanitarian, who will usually be the best physician, in their locality.

If it is true that responsibilities are in proportion to capacities and powers, then a local board of health, which, as in this State, has almost absolute power, must be held responsible for any sickness or death that might have been prevented by a proper use of its legal powers; and an individual Health Officer employed and paid for sanitary advice who does not use the sanitary knowledge of which he is possessed, in a way to make it as effective as possible for preventing sickness and deaths in his vicinity, is especially culpable.

Act No. 157, laws of 1879, makes it the duty of every health officer of a village or city to give notice, to the prosecuting attorney of the county,* of any failure in householders or physicians to report cases of communicable diseases to the health officer or to the local board of health. The act makes no exceptions on account of any other similar provisions in local charters or ordinances. Omitting the title, the act is as follows:—

Health officer to notify prosecuting attorney of all failures to report.

What notice to state.

SECTION 1. *The People of the State of Michigan enact,* That it shall be the duty of the health officer of each village and city in this State, whenever he shall know, or have good reason to believe that any penalty or forfeiture has been incurred within his city or village, by reason of neglect to comply with section one thousand seven hundred and thirty-four or section one thousand seven hundred and thirty-five of the compiled laws of eighteen hundred and seventy-one, forthwith to give notice thereof, in writing, to the prosecuting attorney of his county, which notice shall state, as near as may be, the time of such neglect, the name of the person incurring

* Section 6855, compiled laws of 1871, requires the Prosecuting Attorney to prosecute for any forfeiture within his county.

the penalty or forfeiture, and, as near as can be ascertained, the name or names of persons sick with a disease dangerous to the public health, and not reported as the law requires.

Although as "an executive officer of the board" your power and authority to act will be only that given you by your board, as a "sanitary adviser" you should, and doubtless will, have influence in determining the action of your board, in proportion to your knowledge of sanitary science and your honest effort for the promotion of the public health.

The health officer should be a physician who has given and will give special study to sanitary subjects, and who is qualified to instruct and advise the local board of health in all matters relating to public health which may come before it. The law provides that he shall be a sanitary adviser of the local board of health. In order that his advice may be had to the fullest extent, it seems necessary that generally the health officer should meet with the local board of health, and the local board of health is authorized to fix his compensation, which should include his services at meetings of the board, compensation for his services in reporting to the State Board of Health, etc.

There are many directions in which you can advise your local board of health how to put forth effort for lessening sickness and deaths within its jurisdiction:—

I. EPIDEMICS SHOULD BE PREVENTED.—This can generally be done, if local boards of health will but act efficiently in studying out and applying methods which are now practicable.

As regards small-pox, the legislature of 1879 made an additional provision for its restriction and the first general provision for its prevention, by an act authorizing the board of health of each city, village, and township in the State to offer free vaccination to every child not previously vaccinated, and to all other persons who have not been vaccinated within the preceding five years. This law enables local boards of health better to carry out the recommendation contained in a preamble and resolution of the State Board of Health, adopted in July, 1877, and distributed in leaflet form, as follows:—

THE PREVENTION AND RESTRICTION OF SMALL-POX.

At the regular meeting, July 10, 1877, the Michigan State Board of Health adopted the following preamble and resolution:—

WHEREAS, By means of vaccination and revaccination the people may secure complete immunity from small-pox,—

Resolved, That all local boards of health be advised and requested to direct their health physicians to offer, every year, vaccination with bovine vaccine virus to every child not previously vaccinated, and to all other persons not vaccinated within five years, without cost to the vaccinated, but at the general expense of the locality, as provided for townships in section 1736, compiled laws, 1871.

(Reliable bovine vaccine virus can be obtained of Dr. George E. Ranney, Lansing, Michigan.)

Office of the
SECRETARY OF THE STATE BOARD OF HEALTH,
Lansing, Michigan, August, 1877.

HENRY B. BAKER, *Secretary.*

The law passed in 1879 is as follows (Act No. 146):—

SECTION 1. *The People of the State of Michigan enact*, That the board of health in each city, village, and township may, at any time, direct its health officer or health physician to offer vaccination with bovine vaccine virus to every child not previously vaccinated, and to all other persons who have not been vaccinated within the preceding five years, without cost to the persons [person] vaccinated, but at the expense of such city, village, or township, as the case may be.

Board of health authorized to furnish vaccination.

Vaccination and revaccination are preventives of small-pox, and if the peo-

ple are kept thoroughly protected in this way it is believed that no epidemic of that disease can occur.

Epidemics of communicable diseases can frequently be prevented by restricting outbreaks to the first cases which occur.

II. PROMPT NOTICE OF OUTBREAKS OF DISEASE SHOULD BE SECURED.—For the most effective restriction of *all communicable diseases* one of the first requisites is that your board shall *promptly receive notice of every case* of a communicable disease. The law makes provision therefor; see sections 1734, 1735, 6852, 6853, and 6855, Compiled Laws of Michigan, 1871, and the act printed above (No. 157, laws of 1879), relative to complaints by health officers for failure to report cases of diseases dangerous to the public health. It is especially desirable that the attention of the public in your vicinity be called to the requirements of these sections of the law, and the facts impressed upon the minds of the people that safety from communicable diseases can be secured only by giving prompt notice of the first case and of all cases of any such disease, to the health officer or local board of health, in order that immediate steps may be taken for restricting and suppressing such disease. To complete the provision for such notices is one of the first duties of your board. It is again recommended that your board of health *have a sufficient number of blanks for such notices* for the use of *householders* and *physicians* distributed within your jurisdiction, in order to call attention to the law and secure the material for a complete record in your office and in the office of the clerk of your board. The two sections of law, 1734 and 1735, and summary statements of sections 6852, 6853, and 6855, referred to above, and of act No. 157, laws of 1879, should be printed on the back of each blank. You can also find the form for such blanks for notices on pages 13 and 14 of the First Report (for 1873), on pages xiii. and xiv. of the Second Report, and on pages xxvi.-xxvii. of the Sixth Report of this Board (for 1878), also in amended form on the last leaf of the pamphlet "Circular 34, relative to Notices of Diseases which endanger the Public Health," a copy of which is sent herewith. These blanks can be purchased of W. S. George & Co., of Lansing, for one dollar per hundred.

III. COMMUNICABLE DISEASES SHOULD BE RESTRICTED.—When notice or information of the occurence of a case of a communicable disease reaches the local board, **the board should act promptly for the restriction of the disease.** The prominent duties in this direction are:—

1. Prompt, thorough, and persistent isolation of the persons sick.
2. Public notice of infected places, as required by section 1732, compiled laws of 1871.
3. Thorough disinfection of rooms, and of all articles likely to be infected, before allowing their use by other persons*.
4. As regards small-pox, the vaccination and revaccination of all inhabitants.

As so much frequently depends upon prompt action on notice of a first case of a communicable disease, every board of health should guard against delays in getting a meeting of the board etc., by giving its health officer explicit authority, and requiring him to act immediately on receipt of information of

* For methods, see pamphlet entitled "Restriction and Prevention of Scarlet Fever," issued by this Board, reprinted in the Fifth Annual Report of this Board, for 1877; also a document on Restriction and Prevention of Diphtheria, reprinted on pages 86-89 of the Report for 1878; also an Address on General Sanitation, prepared by a committee of the Sanitary Council of the Mississippi Valley, printed on pages 34-36 of the Report for 1879.

a case of such disease within his jurisdiction, without waiting for a meeting of the board, which, however, should meet as soon as possible.

IV. CASES OF DISEASES WHICH ENDANGER THE PUBLIC HEALTH SHOULD BE RECORDED.—Another duty incumbent upon the local board of health is the recording of the sickness from communicable diseases, and of the deaths of citizens and persons under its protection; such records to be for local use and also to be reported to this State Board, so that, when grouped with records of other localities, the conditions may be studied, and new methods of prevention learned from such unhappy experiences which otherwise will continually be repeated.

A form of "Record of Diseases Dangerous to the Public Health" is printed (reduced in size), at the end of this circular. You can procure printed sheets of such a record, on paper 15½ by 19½ inches, of W. S. George & Co., of Lansing, for eighty cents per quire or three dollars per hundred. If desired, the same dealers will bind them at usual prices.

It is hoped that hereafter you will, as Health Officer, be prepared and make a record of all important facts concerning "diseases dangerous to the public health" which may come under your observation or be reported to you. Aside from the importance of such a local record, it will enable you, when called upon, to make a full report to this State Board concerning cases of such diseases.*

V. MUCH SICKNESS AND MANY DEATHS FROM ORDINARY DISEASES SHOULD BE PREVENTED.—A field of labor, perhaps even wider than that with the communicable diseases, is open to your local board of health, namely, the inauguration of measures for preventing sickness and deaths from the ordinary diseases in this State, a very great proportion of which are now believed by our best sanitarians to be preventable. Some of the prominent measures to be inaugurated are:—

1. More thorough drainage of the soil, especially near dwellings.
2. Better securities against the contamination of the water-supply, particularly in wells, by filth-saturated soil, etc.
3. A strict guard over the purity of the air, and freedom from nuisances and unclean places.
4. Better sanitary and hygienic arrangements and plans in the public schools, and in public buildings and institutions.

In the execution of these measures, much may be accomplished by systematic and thorough inspections and by published reports of such inspections, which shall attract attention to the subject, give definite knowledge of existing defects, and suggest methods of improvement.

VI. NUISANCES SHOULD BE ABATED.—While it is not, as many suppose, the first and only duty of a health officer to smell out a cesspool or an offensive privy, he is the one to whom, from his official position and authority, the people properly look to discover and abate any such nuisance. Freedom from such sources of sickness is believed to be one essential condition of good health in a community, and a duly empowered health officer or a board of health that from any considerations whatever does not do the utmost (and the power of a local board of health under the law is almost absolute) to prevent and remove such unsanitary conditions is guilty of a plain neglect of duty and a

* Act No. 81, Laws of 1873, Sec. 8: "It shall be the duty of the health physician, and also of the clerk of the local board of health in each township, city, and village in this State, at least once in each year, to report to the State Board of Health their proceedings, and such other facts required, on blanks, and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of Health."

violation of official trust. For a valuable discussion of the power of local boards of health in the abatement of nuisances, the reader is referred to a paper on the powers and duties of local boards of health, by Hon. LeRoy Parker, of Flint, published in the Report of this Board for 1879, pages 289–.

VII. SANITARY INFORMATION SHOULD BE DISSEMINATED AMONG THE PEOPLE.—The local board of health should be a center of sanitary and hygienic intelligence for its locality; its meetings should not be infrequent, and should be so managed as to secure papers or discussions on special subjects and on the application of the principles of sanitary science to the particular sources of danger in the immediate vicinity, and otherwise to encourage progress in sanitary knowledge, among the members of the board as well as among the people. Charged, under an official oath, with the duty of guarding the life and health of fellow-citizens, the duty of members and officers of boards of health to seek out the best that is known in public hygiene and sanitary methods, seems to be plain. The best sanitary work cannot be done except by the coöperation of the people with the board of health, and this can be secured when the people are well informed on sanitary subjects; the thorough distribution by local boards of health of all such documents as the one issued by this Board on the Restriction and Prevention of Scarlet Fever and the one on the Restriction and Prevention of Diphtheria, will tend to disseminate useful information and greatly decrease sickness from such diseases.*

Many sources of information in sanitary science and public hygiene are now accessible to those who can secure the literature of these subjects. You can doubtless find something of value without great effort. There are now many works on hygiene, and many periodicals devoted to the subject,—several of them giving especial attention to particular branches of the subject. A knowledge of some of the sources of greatest danger to life in this State may be gained by a study of the Registration Reports on Vital Statistics of Michigan, published by the Secretary of State. These are, or should be, in your township library. A few years ago a pamphlet copy of the Public Health Laws of this State was sent to the health officer of each township, to be delivered to the supervisor if no other health officer was appointed. The first six Annual Reports of this State Board of Health have been sent as issued, and are, or should be, in your township library. Copies of the Fourth Annual Report of this Board (for 1876) were sent by the Board to the health officer or to the county clerks for the health officer of every township, city, and incorporated village in the State. Copies of the Fifth Report (for 1877) were sent to the county clerk (or in some cases directly to the health officer), wrapped and directed to the health officer of every township, city, and incorporated village from which a return of the name and address of the health officer had been received. In each case the health officer was directed to pass the Reports over to his successor in office. These Reports you should obtain from your predecessor in office, if you have not already done so, and in turn pass over to your successor. The Secretary of State has sent a copy of the Sixth Annual Report (for 1878) for each township library. A copy has also been sent by this Board to each health officer, or to the county clerks, for each health officer whose name and address

* The document on the Restriction and Prevention of Diphtheria, issued by this Board, has been stereotyped by the Board, and copies of it may be obtained by local boards of health and others of W. S. George & Co., Lansing, Mich., at the following prices, cash to accompany the order:—

100 copies for	$1.75	400 copies for	$4.25
200 " "	2.50	500 " "	4.75
300 " "	3.50	1,000 " "	8.00

has been reported to the State Board of Health. You will find something relative to work of local boards of health and health officers on pages 6, 11, 15, 16, 29, and 30 of the First Report (for 1873); on pages xi–xv, xxv, and xxviii–xxix of the Second Report; on pages xliii–xlv and 1–10 of the Third Report; on pages xxxvi, xxxvii, 6, 7, 11–12, 127, 128, 129, and 130 of the Fourth Report; on pages xxxii–xxxv of the Fifth Report (for 1877); also on pages ix–xviii and xxiii–xxxiii of the Sixth Report (for 1878).

VIII. YOUR LOCAL BOARD OF HEALTH HAS TWO KINDS OF FUNCTIONS:—1. To utilize for your own people the sanitary knowledge already accessible, as indicated in sections I., III., V., VI., and VII., and elsewhere in this circular; 2. To add to the general stock of such knowledge. You can make additions to sanitary knowledge by original research, by means of records of experience, including such as may be secured by methods indicated in sections II. and IV. of this circular, by means of vital statistics, which supply an important basis for public hygiene, and by freely reporting to this Board, which will then eventually be able to give to each local board the benefits of the experience of all the others. In order to be able to report to the State Board of Health as the law requires, the local board must collect facts. If the local board does not receive notices of cases of communicable diseases, this is, in some degree, its own fault; because the law requires each member of the township board, whenever he shall "have good reason to believe" that a forfeiture from neglect to report any such case has been incurred "forthwith to give notice" to the supervisor; and it is the duty of the supervisor "forthwith to commence and prosecute a suit;" and in cities and villages, the law makes it the duty of the health officer to report to the prosecuting attorney all cases of forfeiture under sections 1734 and 1735; and the prosecuting attorney is required to prosecute for all such forfeitures.

In case any disease appears in your locality as an epidemic, please send a Special Report of the facts to this office as soon as possible. It is particularly desirable that you study and record the conditions coincident with the rise, progress, and decline of any epidemic. It is hoped that you will correspond freely with this Board. Whenever there occurs, in your locality, any outbreak of a communicable or preventable disease, it is expected that you will inquire into, study, and record the conditions coincident with the rise, progress, and decline of any such outbreak, and, besides making the local record, be prepared to make a valuable report to this Board. Every such instance of suffering in your locality should be made to yield some valuable data useful for advancing the cause of public health.

By direction of the State Board of Health.

Very Respectfully,
HENRY B. BAKER,
Secretary.

[Please preserve the circulars received from this office.]

RECORD OF CASES OF DISEASES DANGEROUS TO THE PUBLIC HEALTH, WHICH HAVE OCCURRED

RECORD NUMBER.	RECEIVED FOR RECORD.			FULL NAME OF PATIENT.	SEX.	Age in Years, last Birthday.	NAME OF DISEASE.
	Month.	Day.	Year.				

IN THE .....OF....., COUNTY OF....., STATE OF MICHIGAN.

TAKEN SICK.			WHETHER DIED, LIVING, OR RECOVERED.	DATE OF DEATH OR RECOVERY.			PERSONS WHO FURNISHED THE FACTS FOR RECORD.	
Month.	Day.	Year.		Month.	Day.	Year.	NAME.	P. O. ADDRESS.

The reported source of contagion or infection, in each case, was as follows: For the case recorded as No. ..... it was.....

(Blank sheets of Record, similar to the form here indicated, on paper 15½ by 19½ inches, printed on both sides alike, so that it can be bound in book form, can be procured of W. S. George & Co., Lansing, Mich., for 80 cents per quire, or $3.00 per hundred. If desired, the same dealers will bind them at usual rates.)

THE WATER-SUPPLY

Of Localities in Michigan,

AND ITS

RELATIONS TO HEALTH AND DISEASE,

IN SOME OF THE

TOWNSHIPS, CITIES, AND VILLAGES THROUGHOUT THE STATE;

BEING REPLIES BY

REGULAR CORRESPONDENTS

OF THE

STATE BOARD OF HEALTH,

AND BY OTHERS,

TO ITS CIRCULAR No. 7.

Arranged for publication by the Secretary of the Board.

RELATIVE TO THE WATER-SUPPLY OF LOCALITIES IN MICHIGAN.

In the Annual Reports of the State Board of Health for 1875 (pp. 105–132), 1876 (pp. 81–104), and 1877 (pp. 143–166) were published replies by regular correspondents of the Board to Circular 7, first issued in 1875, relative to the water-supply of localities in Michigan. Since the publication of the Report for 1877 a few more replies to the circular have been received, which are here published for study in connection with those already published, as a contribution to the sanitary survey of the State, and because of what they contain concerning the relations of the water-supply to various cases of sickness.

For convenience in studying the replies, the circular is here reprinted. It is followed by the replies arranged in the order in which they were received.

[7.] CIRCULAR TO CORRESPONDENTS RELATIVE TO WATER-SUPPLY.

OFFICE OF THE STATE BOARD OF HEALTH,
LANSING, MICHIGAN, October, 1875.

To the Correspondents of the State Board of Health:

GENTLEMEN:—Dr. Arthur Hazlewood of Grand Rapids, a committee of this Board on "Food drinks, and water-supply," desires to collect information relative to the water-supply throughout this State. Will you have the kindness to send, as soon as convenient, to the central office of this Board at Lansing, your responses to the following questions? In your reply it will not be necessary to repeat the questions, but simply to refer to them by number.

1. Are you located in a city, village, or in the country?
2. From what source is the chief water-supply of your city, village, or locality?
3. What relation does the water-supply sustain to the drainage and to the sewerage of your own or of some neighboring city, village, or locality?
4. If there is close relation with sewerage, of what does the sewage consist?
5. If the water is taken from a stream, what is the rapidity and direction of the current; is it constant in direction; if not, what affects it, and what are the usual conditions?
6. From what distance is the water brought?
7. In what kind of conduit?
8. To what extent is it accumulated in settling or other reservoirs?
9. Is any process for filtering or purifying used, besides reservoir settling?
10. What is the average amount of water flowing into receiving reservoirs each day?
11. What is the average amount of water consumed each day?
12. How many gallons daily to each inhabitant?
13. To what extent is water from artesian wells used?
14. To what extent is cistern water used?
15. Is it filtered before storing?

16. Is it filtered before use?
17. Of what material are the cisterns constructed?
18. To what extent is spring or well water used?
19. In that part of your city, or in localities where well-water is used, what is the character of the soil?
20. What is the usual depth of the wells?
21. What strata of earth are passed through?
22. State, if you can, in what direction the strata dip?
23. State, if you can, the nature of the stratum which underlies and maintains the water in the wells?
24. What is the usual distance between the well and the nearest privy?
25. What is the usual distance between the well and the nearest cesspool?
26. Please give details of any cases of marked exception within the distance named in answer to last two questions?
27. Are the water-works, cisterns, springs, or wells so located and constructed that there is no danger that the water therefrom may be subject to sewage, cesspool, or other contamination?
28. Has the water supplied by water-works, cisterns, springs, or wells been offensive in taste or odor at any time? If so, at what time, and what was the cause?
29. Have any analyses of water in your locality been lately made? Please send results of all analyses.
30. Except where results of analyses are sent, please state your opinion of the quality of the water from the water-works, wells, cisterns, artesian wells, etc. Is it clear or turbid? does it probably contain organic matter in dangerous form or amount? is it hard or soft?
31. What have you observed as to the contamination of water by decomposition of wood, pipes, pumps, curbing, etc., at or near the surface?
32. What, as to lead or other metal derived from pipes or vessels with which the water has been in contact?
33. What have you observed as to the influence of rainfall, freshets, or drought upon the purity or healthfulness of the water-supply?
34. What relation between the water-supply of any of the inhabitants, and the graveyards of your locality?
35. Please give details of any cases of sickness which have occurred which could be fairly attributed to drinking impure water, or to its use for other purposes?
36. Please give a statement of any apparent influence, due to quality of water used, upon cases of epidemic or other diseases originating from other causes?

After sending in your response, please preserve this circular, as a memorandum of some of the points connected with this subject upon which this Board desires to hear from you hereafter whenever you have anything of interest on the subject to communicate.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,
Secretary.

REPLIES BY N. D. LEE, M. D., OF SAGINAW CITY, MICH.

1.* In a city.

2. From wells, for drinking and culinary purposes; from the river, bounding the city on the east, for water for fire department, and for sprinkling streets, gardens, etc., in Summer, and water troughs, for horses, cattle, etc., all the year.

3. For family use, none, excepting that the sewers have a tendency to keep the water in our wells lower than it would otherwise be,—in fact, down to about a level with the sewers, which are about six to nine feet from the surface of the ground. These sewers drain a large portion of our city, and empty into the river, nearly all of them, a little above where the Holly water works takes its water from the river, for fire department, etc.; they drain a large portion of the surface of the ground, a

* The figures beginning paragraphs refer to questions in Circular 7, on pages 281-2 of this Report.

great many privies, barns, etc. None, in relation to any other city, village, or locality.

4. Embraced in above, as I understand the question.

5. The current, at lowest water, almost none; in high water, two to four miles an hour, owing to winds partly; we are but very little above Saginaw Bay and Lake Huron; direction northeasterly; it is constant in that direction. Nothing affects it but high winds off from the bay; then it is up stream, apparently.

6. Immediately from the river, in front of the city, for water-works.

7. In iron and wooden conduits; the wooden ones are banded with iron, and all covered with pitch; I believe most of them are iron.

8. No reservoirs, no settling.

9. No filtering generally; a few families have family filters, and filter and use the river water; some filter well-water, and some cistern-water. Some use the river water without filtering, mostly low French, Irish, and German families, who will grow fat on almost any filth.

10. None.

11, 12. I do not know.

13. Very little.

14. Several families use cistern-water. I do not know how many.

15. Some do, and some do not.

16. It is.

17. Some with stone, some with brick and cement in both, and some are large wooden tubs.

18. Nearly all use well-water; a few springs have been struck in digging and boring deep wells.

19. The surface soil is in some places a sandy loam, some clay and muck, some sand, gravel, and clay mixed; from one foot to three or four feet deep, then comes yellow clay. The following record of stratification, together with my comments on blue clay, is a fair sample of the whole city and country. This clay does not hold water down as far as our wells are dug generally, if there is any place for it to run into, and water will run or soak through it very readily.

Record of Stratification of a Salt Well of Swift and Lockwood, on high Land, bored by Wm. Brock, and Completed Jan. 25, 1876.—Total Depth, 857 Feet.

Composition of Strata.	Thickness of Strata,—Feet.	Composition of Strata.	Thickness of Strata,—Feet.	Composition of Strata.	Thickness of Strata,—Feet.
Blue clay.....*	72	Lime rock.....	12	Black shale.....	15
Stone and gravel..	5	Lime and shale mixed.....	34	Lime rock.....	4
Hardpan.....	23	Hard lime rock..	22	Sand rock.....	4
Shale	20	Black shale.....	36	Light shale.....	15
Lime rock.....	20	Glutinous shale..	8	Lime rock.....	11
Sand rock.....	10	Slate	3	Shale rock.....	23
Shale rock.....	110	Hard lime rock..	17	Lime rock.....	18
Sand rock.....	111	Sandy shale.....	11	Shale rock.....	4
Sandy shale.....	45	Shale without sand	6	Sandy lime.....	8
Sulphate of iron..	4	Hard lime rock..	2	Salt rock.....	112
Coal..	2			Red marl.....	45
Black shale.....	25				
Total.....					857

* This is not just as it should have been recorded; the first six to twenty-five feet in which our wells are dug, after you pass through the surface soil, is a yellow clay, with lime and other gravel in it, very sticky when wet, and very hard when dry; it is full of water-seams, cutting the clay into cube-like and irregular forms, through which water passes very readily. The clay lining these water-seams is covered with a blue-like substance in general, which has led well borers and diggers to call it blue clay, which it is not. The real blue clay underlies this stratum of yellow clay, and is nearly or entirely impervious to water, excepting a vein or spring of water may pass through it; and well-borers, for fresh water for family use, have recently struck veins of water evidently in this blue clay.

The above is an exact copy of the record furnished me by the owners of the well, excepting my comments on blue clay.

The low ground or the middle ground for the first fifty or sixty feet in depth in this city, is evidently of more recent deposit; probably it was once a portion of Sag-

inaw Bay; when they bore down in this portion about fifty-five feet, they strike a stratum of gravel and sand, and get a flowing well of pure water. When the first salt-well in this city was bored, at a depth of fifty-five feet they struck this gravel and sand and passed through the trunk of a tree, bass-wood I believe, and sound, and also got a flow of pure fresh water five or six feet above the top of the ground. I believe that we could get from this strata an abundant supply of pure water for our city.

20.* 12 feet to 20 feet.

21. See answer 19 and record of stratification, and my comments on blue clay.

22. I should think northeasterly,—perhaps I am wrong; see report of State geologist.

23. I do not know positively which stratum holds the water in the wells, except it is the real blue clay first below the yellow clay. I think the river, Saginaw Bay, and Lake Huron have a great deal to do with it.

24. 8 feet to 75 feet.

25. No cesspools in the city that I know of; drains running into the sewers are used instead.

26. I know one well, which has a spring in it, they say, with a barn where the horses stand within ten feet, and a privy within twenty feet, by guess; another with eight privies (or it did have last Summer), from eight to sixty feet from it, or thereabouts.

27. Water-works, no; cisterns, yes, except what is natural to rainwater; springs, we have none, except what are in wells; our wells, most of them, seem to be very good, but some are contaminated. I have seen some with angle-worms, and little worms from an eighth to half an inch long that resemble angle-worms (I have not examined them carefully), and many other insects, one in particular that I have seen in creeks and pools of water; it is about one inch long, with legs, a fin tail, and big head, and swims by kicking itself through the water with tail and legs,—a brilliant description. I shall have to pay more attention to entomology if I go into a description of all the insects to be found in what we eat and drink. I have no doubt that privies, barns, and sewers poison a great many of our wells, the same as in every other compact locality, and on many farms all over the country.

28. Yes, as to water-works in Summer, result of deposit from sewers. Yes, to cisterns, particularly wooden ones, open to the air in Summer, when decomposition of animalculæ takes place in them. No, when cisterns are made of stone or brick with cement, in the cellar, and not open to the atmosphere too much, and where they are comparatively cool; those owning them inform me so.

29. No analysis, that I know of.

30. In my opinion, water from the water-works is not fit to sprinkle streets or yards in Summer, but it may do where you want to fertilize your gardens. Our wells are, most of them, very good; some are bad, owing to locality. Cisterns, where used for culinary and drinking purposes, are generally reported good. I have a very grave chemical and medical objection to the use of rain-water for drinking and culinary purposes. Artesian wells are not much used, but the very best of water can be got from them here with a little expense. Water from the water-works is clear, except when the river is high, then it is muddy, and contains organic matter at all times (except in winter, possibly, when everything is frozen) in dangerous form and amount, and is nearly soft. The water from wells is clear and hard; see answer to question 27. That from cisterns is clear, soft water. That from artesian wells is clear; I do not know whether it is hard or soft; I should think it a little hard.

31, 32. Nothing.

33. Wells, where we have sewers, barns, and privies in close vicinity, are best when the water is high in them, if the water is taken from the bottom of the well. I believe the most of the poison floats in the water near the surface. My experience teaches me that we have more sickness when we have low water, which brings the poison to the bottom of the well, where we get it by pumps in a concentrated form, which also makes a reservoir of the well for everything in a fluid state within a hundred feet of the well to flow into it (that is, everything above the level of the water in the wells), through the water-seams in the clay; this clay purifies it some, no doubt; a moderate height of water is best.

34. No graveyards within a mile.

35. My attention was called to a family of five, father, mother, son, and two daughters, all adults, who were sick last fall with seemingly a sort of lingering intermittent fever. They were not very sick, but did not get well, would relapse when they ceased the use of medicine. Sometimes they had sore throat, something like diph-

* The figures beginning paragraphs refer to questions in Circular 7, on pages 281-2 of this Report.

theria, easily controlled, but they kept declining. My attention was called to the water; I found it as in answer 27. I forbade the use of the water, and had them use water from a well about one hundred and twenty-five feet from this well, in which I found no insects, and they got well without much more medicine. I was called Dec. 22, 1877, to see a child seven months old, and found it had cerebro-spinal meningitis. It died Dec. 27, 1877. I examined their well-water, and found the same insects that were in the other well. They have lost three children (they tell me) in the same way. There might be many other cases found in my past experiences, which I attribute to bad water.* But you cannot make one in ten believe it,—they lay it all to some mysterious dispensation of Divine providence.

36. I cannot, now; no epidemic now.

I have tried to answer your questions as I understand them, to the best of my belief and opinion.

Saginaw City, Jan. 26, 1878. N. D. LEE, *City Physician.*

REPLIES BY SIMEON BELKNAP, M. D., OF NILES, MICH.

1. In a city.
2. From wells and cisterns. Some ten families have running water from a spring near the city, but it has been in use but a few months. A company now formed have commenced work laying pipes to supply the city from a lake some four miles distant.
3. Our system of drainage is variable and very imperfect.
4. No system.
5. From wells mostly.
13. But very few.
14. Very few.
15, 16. Yes.
17. Brick and water cement.
18. Pretty generally.
19. Sandy.
20. Ten feet to fifty feet.
21. Sand, gravel, and clay.
22. Northwest.
23. Clay.
24. Three rods to six rods.
25. I cannot tell.
26. Variable.
27, 28, 29. No.
30. Clear and hard.
31, 32. Nothing.
33. During extreme wet weather the water rises.
34. Nothing.
35, 36. I cannot tell.

Very respectfully,

Niles, Berrien Co., Mich., March 21, 1878. SIMEON BELKNAP, M. D.

REPLIES BY GEORGE H. RILEY, M. D., OF NEW TROY, MICH.

I am located in a village of 300 inhabitants. Our chief water-supply is from wells; there is an occasional spring. Our town is on an elevated plat of ground, with low marshy ground on the east and west. I might say we are located on a sand hill, for about all the soil seems yellow sand. We have no sewers other than the marshy ground, which keeps us quite dry. I have skipped questions 6 to 16, as they evidently refer to cities having water-works. We have no cisterns; the well-water answers every purpose. The character of the soil near our wells is sandy. The usual depth of our wells is about 15 feet, the deepest about 30. The earth passed through in digging wells is mostly sand—clay near the water. The strata dip north. The stratum which underlies and maintains the water in our wells is clay and gravel.

The usual distance between well and privy is about 40 feet. I was told by a well-digger in town this morning that he dug a well some time ago 20 feet from the privy, in a direct line in the course the water ran, and the well shortly became very offensive, and they were obliged to fill it up. I believe our water is not contaminated in any way from cesspools. Our water has maintained quite a pure character. It is probable that no analysis was ever made of our water. Our well-water is quite clear, a little on the bluish cast; it does not contain an excess of organic matter; it is quite soft. The curbings, etc., are kept up nicely, so that we do not fear contamination from them. In regard to severe drouths or rainfall, we have an increase of malaria. We have no graveyards near here. I am glad to answer, as best I can, any questions you may ask.

Respectfully yours,

New Troy, Mich., Nov. 19, 1878. G. H. RILEY.

REPLIES BY S. C. VAN ANTWERP, M. D., OF VICKSBURG, MICH.

1. Village of Vicksburg, 1,150 inhabitants.
2. From wells.
3. Surface drainage into Portage Creek mostly.

* For reference to other cases, see, in index to this Report, "Lee, M. D., N. D., Cases of Diphtheria Connected with Use of Bad Water."

4 to 14.* Excluded.
14. Cistern-water only for washing purposes.
18. For all cooking and drinking uses.
19. Sand and gravel, in order named.
20. From 15 feet to 20 feet.
21. Sand, gravel, clay.
23. Gravel.
24. Average, four rods.
28. Water generally very good.
30. Wells on west side of Portage Creek have a deposit of iron, which is shown in quite marked manner, both by sight and taste. Some of the wells which are sunk 15 or 18 feet, if sunk further, are found to have poorer water. Some traces of iodine. The majority of the wells on the east side of the stream are very good and with little, if any, turbidity of water. Drive wells are in use more than any other kind.
30. Rain supply or drought makes but little difference.
34. No graveyard near water-supply.

Additional Remarks.—Several citizens have told me that their wells contained a good deal of ferruginous deposit, but by digging a less distance they obtain pure, clear, and nearly soft water. In the north part of the village, more nearly on a level with the mill-pond, the well-water is more like rain or spring water. The mill-pond adjacent to the village does not seem to cause malarial or other sickness in the families near to it more than in families living at a distance from it.

Respectfully yours,

Vicksburg, Kalamazoo Co., Mich., July 18, 1879. S. C. VAN ANTWERP.

REPLIES BY W. A. NEAL, M. D., OF DAYTON, MICH.

1.* Village.
2. Lake, cisterns, wells, and springs.
3. Situated near the dividing ridge of the drainage between Lake Michigan and the Mississippi. Within two or three miles of the village the water runs both ways. There is no drainage toward us; the drainage from here is mostly north, through the outlet of a small lake.
6, 7, 8, 9, 10, 11, 12, 13. No sewage or system of water-supply.
14. To a limited extent, for cooking; not at all for drinking.
15, 16. No.
17. Brick and water-lime cement.
18. Almost entirely for drinking and culinary purposes.
19. Clay loam with fisures of sand and gravel containing flowing water, that for ordinary uses is inexhaustible.
20. Twenty to sixty feet.
21. Clay loam and blue clay.
22, 23. At ordinary depths there is no dip, the wells do not reach through the drift.
24. Three to five rods.
25, 26. I do not know of any.
27. I know of but few cases; they are open wells that might be contaminated by barnyard drainage.
28. I do not know of any cases.
29. None have been made.
30. Clear, hard.
31, 32. I have made no observations.
33. I have noticed in the few wells that only reach *into* the clay, and that depend on surface supply, it becomes turbid after freshets and falls during drouth; in both instances diarrhea is apt to prevail where water is used from such wells.
34. No relation; no wells near graveyards.
35, 36. Cases in two families, from drinking water from a hole in the ice, near the shore of a lake, within three to eight rods of which were situated two barns and three privies. Details are given in answer to question 42 of Circular 29, in my report of diseases during the year 1878 [page 204 of this Report.]

Dayton, Berrien Co., Mich., July 18, 1879. W. A. NEAL.

REPLIES BY HENRY KREMERS, M. D., OF DRENTHE, MICH.

1.* Country.
2. From wells, cisterns, and springs.
3. No relation.
4, 5, 6, 7, 8, 9, 10, 11, 12. ———.
13. No artesian wells.
14. In a neighborhood of about 50 families, rain-water collected in cisterns, is exclusively used.

* The figures beginning paragraphs refer to questions in Circular 7, on pages 281-2 of this Report.

15. It is not.
16. No.
17. Brick laid in common cement, or cement plastered on to the clay.
18. Most of the water used for culinary and drinking purposes is from wells.
19. Clay and sandy loam.
20. From 12 feet to 50 feet. In most wells the water comes from a depth of 60 feet to 100 feet, the distance from the bottom of the well to the quicksand being drilled.
21, 22. ———.
23. Quicksand.
24. From 20 to 100 feet.
25. No cesspools.
26. ———.
27. The water in most of our wells is reached through a solid bank of clay. No danger of water sinking through; the only danger is from severe rains, when filth and impurities do sometimes wash in through the soft surface soil.
28. Not to my knowledge.
29, 30. ——.
31. The trouble with several wells that are known to give bad water is caused by wood decaying in the well. In one instance all the children drinking water from such a well were taken with bowel complaints.
32. ———.
33. In the early spring a number of wells will contain surface water. (See answer to No. 27.) The more drought the purer the well-water.
34. ———.
35. See answer to No. 31.

Respectfully yours,

Drenthe, Ottawa Co., Mich., July 31, 1879. HENRY KREMERS, M. D.

REPLIES BY WELLINGTON CARLETON, M. D., OF TRENTON, MICH.

1.* Village.
2. Detroit river.
3. The drains and sewers of this place and those north of us, situated on the river, empty into it. All drains and sewers open into river below where water-supply is taken.
4. Surface drainage, but no close relation.
5. About 3 miles per hour, south, constant.
6, 7, 8. Do not apply.
9. No.
10. Does not apply.
11. About 10,000 gallons.
12. About 10 gallons to each person.
13. None.
14. To large extent for washing.
15, 16. No.
17. Pine plank, brick and mortar, etc.
18. Very little.
19. Clay.
20. From 15 feet to 25 feet.
21. Clay for a number of feet, then layer of gravel, then limestone, then layer of gravel again.
22. The stratum of limestone dips southeast.
23. Limestone.
24 and 25. Very few wells in the place; all good distance from privies and cesspools.
26. No cases.
27. Water-works have just been built, with which it is intended to supply part of the town. The water comes from channel of river, and will be forced through tamarack pipes.
28. It has not.
29. None has been made.
30. Most of the people in summer use ice-water, from ice obtained from river, and in winter water from the channel.
31, 32, 33. Do not apply.
34. No relation.
35. For quite a distance above the village, along the shore of the river, a marsh extends, causing the water to be almost stagnant. Those of the inhabitants who use this water for drinking, etc., I think are more subject to malarial diseases than others.
36. I cannot.

Respectfully,

Trenton, Wayne Co., Mich., Aug. 19, 1879. WELLINGTON CARLETON.

The following replies from Drs. Wilson and Yerington were received in connection with the annual reports of the clerk and the health officer of Sumner township, Gratiot county, for 1878. They refer to questions in Circular 7, and are apparently communicated in response to a statement in the circular to clerks, that information "relative to permanent conditions, such as soil, streams, timber, etc., * * * will gladly be received."

REPLIES BY EDWARD WILSON, M. D., HEALTH OFFICER OF SUMNER TOWNSHIP, GRATIOT CO., MICHIGAN.

1.* Elm Hall is a village located on Pine River.
2. Wells and springs. The majority of our springs are upon high banks, 10 to 15 feet above high water mark.
3. No relation.
4. None.
5. Nothing to do with the river.
14. Exclusively for washing.
18. Well-water is used more than spring-water, being more convenient.
19. Sand and gravel.
20. Thirteen feet to twenty feet.
21. In only one instance has blue clay been found in well-digging at this village.
22. East and west.
24. An average of 50 feet.
28. By keeping a washtub filled with water and diapers for days at a time under the spout of the pump, it being allowed to fill and run over, making it necessary to go to the neighbors for pure wholesome water. Such families never fail to have one to two cases of fever on hand the year round.
29. ——.
30. Our wells are of pure clear water, not containing enough organic matter to be dangerous; the water is hard.
31. Nothing, for the reason that our wells are stoned, only two in the village being neglected as stated in 28.
33. Nothing.
34. The graveyard is three-quarters of a mile from town, and has no relation to the water-supply.

REPLIES BY S. D. YERINGTON, M. D., OF VESTABURG, MICH.

1.* In a village.
2. From wells.
3. None, the wells being deep.
4. There is no sewerage.
5. From wells entirely.
6. Wells in the village.
7. None.
8. Depth of water in wells usually 3 feet to 6 feet.
9. No.
10. None.
11, 12. I have no means of estimating.
13. Wells are all dug.
14, 15. None used.
16. ——.
17. Dug into the ground and plastered on the earth.
18. Entirely.
19. Sandy loam, clay and gravel underlying.
20. 18 to 32 feet.
21. Loam, clay, gravel, in the order mentioned.
22. I am unable to state.
23. Coarse gravel.
24. 20 rods to 40 and 60 rods apart. Distance of wells from privies not less than 6 rods in any instance.
25. There are no pools that stand more than a few hours at a time.
26. No extra remarks.
27. There is no danger.
28, 29. No.
30. Water of the wells hard and contains no contaminations or dangerous mineral ingredients. One well used by the village became foul and has been entirely discontinued.
32. There is none.
33. No influence seems to have been felt.
34. The graveyard is too far away to have any influence upon the water of the village.
35. I know of none.
36. Nothing further to remark.

Vestaburg, Montcalm County, Mich., April, 1879. S. D. YERINGTON, M. D.

* The figures beginning paragraphs refer to questions in Circular 7, on pages 261-2 of this Report.

THE

POWERS AND DUTIES

OF

LOCAL BOARDS OF HEALTH.

BY

Hon. LEROY PARKER,

OF FLINT, MICHIGAN,

MEMBER OF THE

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON

Legislation in the Interests of Public Health.

THE POWERS AND DUTIES OF LOCAL BOARDS OF HEALTH.

One of the most important questions pertaining to the work of State and local boards of health, is that of the enforcement of the laws and regulations enacted by the State and local authorities, for the preservation of the public health, the prevention of disease, the abatement and removal of nuisances, the establishment and maintenance of a proper and efficient quarantine, and the collection of vital statistics. The natural laws governing health and disease have been so little understood, on account of the obscurity of the causes of disease, and the prevailing ignorance and indifference of the masses of the people; and the violations of these natural laws have been so gross and frequent among all classes, that it has been found necessary to guard the public against its own ignorance and indifference by the enactment of statutory regulations, which have for their object the restriction and prevention of diseases dangerous to the public health.

That the public generally, in times past, have been ignorant of the sources of danger to health, is not to be wondered at, when we consider how subtle are those influences, which, hidden in many of the elements of nature, have often baffled the researches of the most patient and skilled investigators, while the results of those influences have been only too painfully apparent in the widespread disease and death they have caused.

One of the principal objects of the establishment of boards of health has been to provide an intelligent body of men, whose duty it is under the authority of the State, to make inquiry into these hidden causes of disease; to find out where and in what elements and condition of things danger lurks; to gather facts relating to disease, from which the reasoning mind may draw conclusions; to study the conditions of men's lives with reference to what they eat and drink and breathe, and then to publish to the world the results of their investigations, in order, that being no longer ignorant of the sources of danger, men may know how to protect the interests of health by the adoption of proper preventive measures.

In view of the extensive investigations which have been made by sanitarians into the causes of disease, and the large amount of information given to the world as the result of these investigations, it is strange that there should still exist so great indifference among many classes of people to the observance of the rules necessary for the prevention of disease. It is unfortunately true, however, in spite of the knowledge of the causes of disease which has of late years been so widely disseminated, that voluntary movements for the preservation of the public health have not been as frequent as the importance of the subject would seem to have demanded. Men must be compelled to observe

those rules which sanitary science has found to be essential for the prevention of disease. In other words the State, if it does its whole duty, will oblige people to be healthy in spite of themselves. The best informed and most intelligent thought in the community, knowing the value of human life and understanding the conditions of health; and knowing, too, how prone mankind are to neglect the simplest precautions against disease, have invoked the power of the State to prevent, by the enactment of law, the negligence and carelessness of one portion of the community from injuriously affecting the health and life of the rest.

The effect of many of our health laws is to curtail to a certain extent the perfect freedom of individuals in the use of their property, and to restrain or direct their own actions. The necessity for such laws must be apparent. Take for instance the common regulations respecting persons afflicted with the small-pox, which require that such persons shall be isolated and their bedding and clothing destroyed, so that the dread disease may not be communicated to others. No one can question the wisdom or justice of such a law. For although it restrains the liberty and destroys the property of one individual, yet this is done that the safety of the whole community may be assured.

These same reasons apply to the whole body of health laws. The statutes relating to the collection of vital statistics are really as essential to a perfect sanitary system as those relating to small-pox; for, upon the correct understanding of the causes of disease, the number of deaths in a community, and the various conditions attending them, depends the correct study of death and disease and the determining of the proper preventive measures.

Having thus briefly outlined the reasons for the adoption of a system of sanitary laws, let us next consider what these laws, now in force in this State, require, and to whom their enforcement is entrusted.

THE STATE BOARD OF HEALTH.

The general supervision of matters pertaining to public health has been confided by the law-making power to a State Board of Health, and to local boards of health in each city, village, and township. The State Board of Health consists of seven members, six of whom are appointed by the Governor, and the seventh, the Secretary of the Board, is chosen by the other six. This Board, in the words of the act creating it,* has "the general supervision of the interests of the health and life of the citizens of this State." Their duties are thus prescribed by the same act: "They shall especially study the vital statistics of this State, and endeavor to make intelligent and profitable use of the collected records of deaths and of sickness among the people; they shall make sanitary investigations and inquiries respecting the causes of disease, and especially of epidemics; the causes of mortality, and the effects of localities, employments, conditions, ingesta, habits, and circumstances on the health of the people. They shall, when required, or when they deem it best, advise officers of the government, or other State boards in regard to the location, drainage, water-supply, disposal of excreta, heating and ventilation of any public institution or building. They shall, from time to time, recommend standard works on the subject of hygiene for the use of the schools of the State."

The State Board of Health has no power to enforce any of the laws relating to public health. They can only give to the people such facts respecting the causes of disease and the means of prevention, either generally or in special cases, as they have gained by their investigations, and such opinions and advice

* Act No. 81, Laws of 1873, p. 104.

as their judgment dictates. The active measures to prevent or suppress disease must in all cases be taken by individuals, or by local boards of health and local authorities. Petitions are frequently received by the State Board of Health asking them to take some steps to restrain or remove a nuisance, or to prevent the spread of disease. This work is clearly beyond the province of the State Board, and it is impossible, under the existing law, for them to perform such functions.

LOCAL BOARDS OF HEALTH.

The execution and enforcement of the public health laws devolves upon the local boards of health and the local authorities. By a wise provision of our statutes, every township, city, and village in the State has a local board of health, always organized and ready for business.* In each township, the township board, consisting of the supervisor, township clerk, and the two justices of the peace whose terms of office soonest expire, is the board of health. In cities and villages the mayor and aldermen or the president and trustees are the board of health, unless by some provision of their charter another body is empowered to act as such. In those cities and villages in this State, whose charters so provide, a board of health may be appointed or elected, and it may adopt such regulations and perform such duties as the charter of such city or village may prescribe. Boards of health so appointed or elected under charter provisions, are not governed by the general laws of the State relating to public health, except in those matters for which the charters make no provisions. It is intended, however, that such boards of health shall perform all the duties necessary to be performed by such bodies, and that their powers, if not definitely prescribed by the charters under which they are organized, will be the same as those prescribed by the general law of the State.

Under the law as it existed prior to 1879,† it was held by the Supreme Court of Michigan ‡ that when the charter of a city or village provided for the appointment of a board of health by the council, the provisions of the general law did not apply to such city or village, even though no board of health was appointed by the council; and that the mayor and council could not act as a board of health, the charter having provided for another body to act in that capacity.

By an act of the legislature of 1879, the section of the statute (Sec. 1740, Comp. Laws, 1871), which authorized the mayor and council of cities and villages to act as a board of health, was amended so as to read as follows:—

(1740.) SEC. 49. The mayor and aldermen of each incorporated city, and the president and council or trustees of each incorporated village in this State, in which no board of health is organized under its charter, shall have and exercise all the powers, and perform all the duties of a board of health as provided in this chapter, within the limits of the cities or villages, respectively, of which they are such officers. The provisions of this chapter, and the amendments thereto, shall, as far as applicable, apply to all cities and villages in this State, and all duties which are, by the provisions of this chapter, to be performed by the board of health of townships, or by the officers and inhabitants thereof, shall in like manner be performed by the board of health and the officers and inhabitants of such cities and villages, with a like penalty for the non-performance of such duties, excepting in cases where the charters of such cities and villages contain provisions inconsistent herewith.

It follows from this amended section, therefore, that unless a board of health

* Sec. 1692, Comp. Laws 1871, as amended by Act No. 56, Laws of 1877 (page 66 of this report); and Sec. 1740, as amended by Act No. 145, Laws of 1879.
† Sec. 1740, Comp. Laws of 1871.
‡ Shepard v. The People, 40 Mich., 487.

is actually organized under the provisions of the charter of a city or village, the mayor and council, or president and trustees shall act as such board; and further, that all the provisions of the general law relating to public health shall apply to city and village boards, except in cases where the charters of such cities and villages contain provisions inconsistent with the general law.

It will thus be seen that every portion of this State which has been organized into townships, is within the jurisdiction of some board of health which has full power to act in preventing and suppressing disease. All that is required to make our public health system thoroughly efficient, is for the people in each locality, whether officers of the local board or not, to see that all of the public health laws are strictly enforced.

THE POWERS AND DUTIES OF LOCAL BOARDS OF HEALTH.

The power of local boards of health in making and enforcing necessary regulations for the public health and safety is practically unlimited. In this direction they possess authority as ample as the legislature or any municipal corporation. In some respects their authority is greater than that of any other body known to the law; for when they deem it necessary for the public safety, in order to prevent the spread of disease, they may enter any dwelling, building, or vessel, by force if need be; they may restrain the liberty of citizens, or confiscate and destroy their property.*

They are required by the law to make such regulations as they deem necessary respecting nuisances, sources of filth, and causes of sickness; respecting any articles which are capable of containing or conveying infection or contagion; to make all needful regulations for the interment of the dead; to examine into all nuisances, sources of filth, and causes of sickness within their jurisdiction, and destroy, remove, and prevent the same. If a nuisance, which may in the opinion of the board of health, be injurious to the health of the inhabitants, or any source of filth or cause of sickness be found on private property, the board of health must order the owner or occupant of the premises to remove the same at his own expense within twenty-four hours, and if he refuses or neglects so to do, they may enter upon the premises and remove the same. If any person is found to be infected with small-pox, or any other sickness dangerous to the public health, the board of health must make effectual provisions according to their best judgment to prevent the spread of the disease, and for this purpose they may remove the sick person to a separate house if this can be done without danger to his health; otherwise they must provide medical aid and necessaries at the house where he is; and in such case they may oblige persons to remove beyond reach of the contagion.

A board of health near the borders of the State may make provision to prevent persons coming from any infected place in a neighboring State from traveling into our own State without a permit. They may require the sheriff or any constable of the county to seize any baggage, clothing, or goods suspected of being infected with any disease which may be dangerous to the public health, and to guard the same against removal by any one, or the approach of any one near to such baggage, clothing, or goods. They may order the removal of a person confined in any common jail, if in their opinion he has been attacked with a disease dangerous to the safety of the other prisoners or the inhabitants of the vicinity.

Boards of health in places bordering upon our lakes or navigable rivers may

* *Comp. Laws*, 1871, Sections 1699, 1700, 1701, 1703, 1704, 1708.

establish quarantine regulations to be observed by all vessels, goods, and persons arriving within their limits. It may be said generally in enumerating the powers of local boards of health, that whatever is necessary to be done to prevent sickness or disease in a community must be done by such boards, and they possess the authority to enforce the provisions of the law and the regulations which they may establish.*

From these enumerated duties, and only the principal ones have been mentioned, it will be seen that local boards of health, while they possess large powers, have also large responsibilities. Upon their prompt and efficient action oftentimes depend the safety of life and health to a whole community. A single case of a communicable disease may, if attended to in time, be so isolated and guarded as to convey no contagion to others, while a little neglect may allow the poison of disease to spread through a dozen homes, and leave a dozen stricken families to mourn the ravages of "the pestilence that walketh in darkness."

NOTICE OF REGULATIONS OF BOARDS OF HEALTH.

In order that the public may know and understand all that is required of them by public health regulations, the law provides that notice shall be given by the board of health of all regulations made by them, by publishing the same in some newspaper within their jurisdiction if there be one published therein, and if not, then by posting them up in five public places; and such notices of the regulations shall be deemed legal notice to all persons.†

It is essential that this requirement of the statute should be complied with in all cases where boards of health make any regulations which they may deem necessary for the public health and safety as provided for in the public health laws. Without such notice previously published, a board of health would have no right to proceed to enforce such regulations; and no penalty could be imposed for the violation of a regulation which had not been brought to the public attention by the proper legal notice.‡

This requirement of the statute does not apply, however, to those acts which are forbidden by the public health laws or by the ordinances of any city or village. The statute law and the ordinances are sufficient notice in themselves to the public. Neither would it be necessary to publish regulations respecting nuisances which are nuisances *per se*, or public nuisances, or nuisances by the common law, for such nuisances can be abated or removed by any one injured thereby, and the right to abate such nuisances does not depend upon any statute or regulation. This statute can only apply to those regulations which boards of health are empowered to make under sections 1694, 1695, 1696, 1720, 1727, and 1730 of the compiled laws of 1871, and the amendments thereto.

A board of health, for instance, may make regulations for the removal and disposition of all refuse, garbage, and filth; for the maintenance of cleanliness, and for the prevention of any contamination of the soil or air, which might, if suffered to remain or continue, produce sickness. Notice of such regulations must be published in order that the public may be warned against allowing such sources of disease to exist. After the publication of such notice any person may be proceeded against and a penalty enforced for the violation of the regulations. On the other hand no notice of any regulation respecting

* Comp. Laws, 1871, sections 1694, 1695, 1696, 1697, 1699, 1700, 1701, 1703, 1704, 1706, 1707, 1708, 1709, 1710, 1711, 1715, 1720, 1730, 1731, 1733.
† Comp. Laws, 1871, Sec. 1698.
‡ Reed v. People, 1 Park., 481.

any existing nuisance, is required to be published before the board of health would be authorized to remove the same. Authority is conferred in such cases by the statute.

Every board of health in cities, villages, and townships should adopt and publish a code of sanitary regulations to be observed by all citizens, embracing the following principal points, and such others as their judgment deems proper and the peculiar conditions of their locality may seem to require:—

1. For a sanitary survey of the city, village, or township with reference to the sewerage, drainage, and water-supply; the number and sanitary condition of the inhabitants; the accumulations of filth, and the disposal of excreta, garbage, and offal; the location of offensive trades and occupations, with a view to obtain the fullest information as to the sanitary condition of the locality.
2. For an efficient system of sewerage, with occasional inspections.
3. For the cleansing of all streets, alleys, courts, and yards.
4. For the location and conducting of slaughter-houses, rendering-establishments, and other offensive occupations.
5. For the regulation and inspection of markets.
6. For the management of lodging-houses, public buildings, and dwellings, with particular reference to the condition of cellars, drains, water-supply, and ventilation.
7. For public baths.
8. For the interment of the dead.
9. For a complete record of deaths, causes of death, etc.
10. For vaccination and re-vaccination.
11. For the restriction of epidemic and contagious diseases.
12. For the quarantine of vessels, baggage, and persons.

Each of the above mentioned subjects for regulation may not be of equal importance in all localities. They will vary in importance according to the varying conditions of town or country, city or village, inland or shore town; and boards of health in adopting a code of regulations will necessarily be governed by the particular sanitary needs of the territory over which they have jurisdiction.

RESPONSIBILITY OF BOARDS OF HEALTH.

One of the first questions which a board of health should ask, after it has ascertained its powers, is, What are the duties which we are called upon to perform? How shall we act so as best to fulfill the obligations imposed upon us by the law of the State? The thought which should be foremost in the mind of each member of the board when contemplating the duties of his position is, that the work which is before him is humanitarian in its character and not political; that the sanitary needs of the community must be examined into, and the condition of things with reference to health and disease must be studied, and if need be, bettered; and this not in a perfunctory or superficial manner, but with a zealous determination to do whatever is necessary for the protection of the life and health of the people whose interests are entrusted to him and his fellow members.

While the duties of boards of health in townships, cities, and villages are substantially the same, yet the responsibilities resting upon such boards in thickly populated centres are vastly greater than in the sparsely settled portions of the State, devoted more exclusively to farming. In cities and villages, where the conditions of living made necessary by large numbers of people crowded into a

small territory, are so different from those in the country, where dwellings, manufactories, barns, out-houses, wells, cess-pools, sewers, and drains oftentimes exist in great numbers upon comparatively small tracts of land and within a few feet of each other; where crowds of people are constantly mingling together on the street, in churches, and in places of public amusement, the duties of a board of health involve grave responsibilities and demand a high degree of care and attention. One defective sewer may contaminate with death-breeding seeds of disease scores of homes, and be the means of causing death to enter many happy households. An accumulation of filth at some one point may be the means of filling the air with miasma and the soil with poison, which, percolating through the earth, may reach a dozen wells, and thus scatter disease broadcast throughout the neighborhood. One person afflicted with a contagious and dangerous disease may, by passing along the street or coming into an assemblage of people, be instrumental in communicating the disease to many others. Every such cause of disease should be promptly and vigorously suppressed. It is the duty of boards of health to take prompt and efficient steps to this end.

While the responsibilities of boards of health in cities and villages are proportionately greater than in the townships, yet the importance of organization and careful attention to the sanitary conditions of the town must not be underrated. Epidemics sometimes sweep through a farming community, which might easily have been prevented by prompt action on the part of the board of health, had immediate notice of the first case been given to them. Nuisances in the shape of stagnant pools of water or undrained marshes often exist in the townships, which are fruitful sources of disease to the inhabitants and should be abated in the manner provided by law. All boards of health should therefore ascertain whether any cause of disease exists within their jurisdiction, and if there is reason to apprehend that any source of sickness may possibly arise from the action or neglect of any person, the board should establish such regulations and take such measures as they may think necessary to prevent the same.

NOTICES OF DISEASES DANGEROUS TO HEALTH.

Every board of health should insist upon a strict compliance with those sections of the public health laws* which require immediate notice to be given to the board of health or health officer when any person is taken sick with small-pox or any other disease dangerous to the public health. There is no provision of the public health laws of greater importance to the public than this. It would be impossible to estimate the advantages, which a thorough compliance with these sections of the law would secure, in the largely increased immunity of the people from contagious diseases, consequent upon the immediate notification of the board of health of the first case of such contagious disease and the prompt isolation and care of the person affected. Such action would have the same effect upon the spread of disease that a well trained and disciplined fire department, ever alert to respond to an alarm, has upon a newly kindled fire, which, if left unchecked, would spread into a devastating conflagration.

In order that physicians and householders may fully realize the importance and necessity of giving immediate notice of dangerous diseases, any neglect so to do should be promptly punished in the manner provided by law. The infliction of the penalty prescribed by the statute, in a few instances, would doubtless have the effect to make all persons careful to send notice at once to the

*Sections 1734-1735, Compiled Laws 1871, page 263 of this Report.

board of health or health officer of the occurrence of any case of contagious disease. The duties of physicians and householders in this regard, and the method of procedure for the enforcement of the law requiring such notices, are fully set forth in Circular No. 34 recently published by the State Board of Health.* The statute † makes it the duty of the health officer in cities and villages to notify the prosecuting attorney of the county of any neglect to give notice of the occurrence of dangerous diseases, as required by sections 1734 and 1735, Comp. Laws 1871, which sections are explicitly made to apply to cities and villages by section 1740, as amended by Act No. 145, Laws of 1879. It then becomes the duty of the prosecuting attorney to prosecute the person so offending for the penalty or forfeiture imposed by the statute.

In townships it is made the duty of the supervisors to prosecute for the penalty or forfeiture so incurred; or when the fact that any person has violated the provisions of these sections has been made known to the prosecuting attorney, it becomes his duty, without delay, to prosecute for such penalty or forfeiture. It will thus be seen that the legal power vested in the public officers is ample to enforce a requirement of the law which all persons must concede to be of the highest importance to the interests of public health and safety.

NUISANCES.

An important duty which boards of health are frequently called upon to perform, is the removal and abatement of nuisances which may be injurious to the health of the public. The power to remove and abate nuisances is derived from two sources.

1. The common law gives to every person the right to abate a nuisance whether it be a public or a private nuisance if it in any way affects the enjoyment of his property or his life. But this right must be exercised with extreme caution, and only when the thing to be abated is in itself a nuisance and is injuring the person seeking to abate it; otherwise he will be liable for trespass. It is only in cases where a party would have a right of action against another maintaining a nuisance that he would be protected in summarily removing the same.‡

It has been held that if a noxious trade be set up in the vicinity of another's dwelling, he may enter the premises and destroy so much of the machinery as is necessary to prevent the nuisance.§ So, too, if an *unoccupied* house be left in such a filthy condition as to endanger the health of the neighborhood, any person who is injured thereby may tear down the house.‖

2. The statute, sections 1699, 1700, and 1701¶ of the Compiled Laws of 1871, provides that boards of health shall examine into all nuisances, sources of filth, and causes of sickness, that may in their opinion be injurious to the public health and shall destroy, remove, and prevent the same. If any such nuisance, source of filth, or cause of sickness shall be found on private property, the board of health shall order the owner or occupant thereof, at his own expense, to remove the same within twenty-four hours. If the owner or occupant do not comply with this order the board may cause the nuisance, source of filth, or cause of sickness to be removed.

In order that boards of health may act understandingly in the removal of nuisances which are injurious to the public health, it is essential that they should have a clearly defined idea of what the nuisances are which they may

* Pages 261-8 of this Report. † Act No. 157, Laws of 1879. ‡ Wood's Law of Nuisances, Secs. 730, 838; Cooley on Torts, p. 46. § Manhattan Co. v. Van Keuren, 23 N. J., 141. ‖ Harvey v. Dewoody, 18 Ark., 252; Wood's Law of Nuisances, Sec. 836. ¶ Page 67 of this Report.

remove or order removed. An actionable nuisance is said to be anything wrongfully done or permitted which injures or annoys another in the enjoyment of his legal rights.* Every person has the legal right to the fullest enjoyment of his life and health. Any thing then which injures or annoys the public in the enjoyment of life or health is a nuisance which it is the duty of boards of health as the guardians of the public health, to abate. Any classification of nuisances will be necessarily imperfect; yet, for the purposes of this subject, it may be said that public health nuisances are of two kinds:—

1. Those which are such from their very nature, which cannot exist in the vicinity of habitations without causing offense to the senses and injury to the health; such, for instance, as the exposed and decaying carcasses of dead animals, or accumulations of offal or fecal matter in exposed places.

2. Those which become nuisances by reason of the misuse or negligent care exercised of an otherwise harmless and perfectly lawful object, business, or occupation; as, for example, slaughter-houses, rendering-establishments, mill-ponds, or burying-grounds.

The methods of procedure to be adopted for the removal of any unhealthy nuisance will vary accordingly as the nuisance to be abated comes within one or the other of these classifications.

If a board of health finds any decomposing or offensive matter upon private property, which in their opinion is injurious to health, they must first order the owner or occupant to remove it within twenty-four hours. If he neglects to do so they may proceed summarily to cause such nuisance to be removed. If the danger to the public health is imminent and safety requires the immediate suppression of the nuisance, the board of health or any individual affected thereby, would be protected if they proceeded at once to suppress it, for the safety of the people is the highest law.† If any unhealthy nuisance is found in a public place, it would be the duty of the board of health to see to its immediate removal. On the other hand, in the case of a mill-pond, a slaughter-house, or a burial ground, a board of health would have no authority to order their removal or abatement as nuisances under section 1700 of the Compiled Laws of 1871, without the fact first being determined judicially that they are nuisances, for the reason that they are not necessarily offensive or unhealthy, and their use is perfectly legal. It is only their misuse which makes them nuisances. A mill-pond may be maintained in the midst of a thickly populated community without being in the slightest degree detrimental to the public health. A slaughter-house may be conducted with such perfect cleanliness as to be no more offensive in a sanitary sense than a planing-mill. It is true that they are very rarely so managed; but it is to be hoped that in the not too distant future those who supply our tables with meat will find it for their interest and profit to unite the slaughtering of animals in one *abattoir* in each locality, and that one well supplied with plenty of water, good drainage, and ample facilities for manufacturing the offal into fertilizers.

If a mill-pond, a slaughter-house, or a burial ground, or anything of a kindred nature becomes offensive and unhealthy to the community, it is the duty of the board of health to proceed at once to ask the aid of the courts by filing a bill in chancery in its own name, to enjoin the further continuance of the nuisance, and to decree its abatement. Whether a business or a thing, not in itself a nuisance, is so managed or suffered to exist as to be a nuisance, is a fact which must be determined by the courts upon evidence. A board of health cannot decide that to be a nuisance which is not so in itself. A person

* Cooley on Torts, p. 565.

† Meeker v. Rensselaer, 14 Wend., 397.

carrying on the business of slaughtering animals cannot be compelled to discontinue that business upon the judgment of any person or tribunal except that of a court of competent jurisdiction. In this way alone can a board of health *legally* ascertain whether such a business is a nuisance so as to authorize them to abate it. Of course any collection of offal or filth in or about a slaughter-house may be removed by the board of health under the authority conferred upon them by sections 1700 and 1701, Compiled Laws 1871, but the suppression of the business itself can only follow a judicial determination that it is so conducted as to be injurious to the public health.*

The question has sometimes arisen whether animals affected with a contagious disease may be summarily destroyed. The general rule seems to be that so long as the owner restrains the animals upon his own premises, no person has the right to kill them; but if they are suffered to go at large, or if they escape from the owner's custody, the owner of the premises upon which they escape, may kill them if necessary for the protection of his own animals.† In the case of horses affected with glanders, which is recognized as an incurable disease,‡ and one which may communicate all its loathsomeness and fatality to human beings, there is no question but what a board of health would be protected in destroying them wherever found, after due notice to the owners, if in their opinion it was necessary for the public health. This protection however would only be afforded in case the disease was actually the glanders.

The statute § provides that "The circuit court for any county shall have equity jurisdiction in all matters concerning nuisances where there is not a plain, adequate and complete remedy at law, and may grant injunctions to stay or prevent nuisances." Boards of health are thus armed with power to suppress unhealthy nuisances, which they should be prompt to exercise in any case where it seems to them that the public health is or will be affected. It is true that any person injured by the maintenance of a nuisance may, in his own behalf, institute proceedings to abate it; but as most individuals are unwilling to go to law about a bad smell, or to incur the necessary expense of litigation, and as a union of effort among several persons affected is rarely obtained, it is eminently fitting that each board of health should perform this duty in behalf of the whole community, of which they are the representatives and of whose health they are the guardians.

It would be well for the members of every board of health to acquaint themselves as fully as possible with all the facts relating to any existing nuisance, or thing which may become a nuisance, within their jurisdiction, and apply to these facts the existing law, and thus ascertain in what way they shall proceed to prevent or remove the same.

Misdirected zeal is sometimes as harmful as lack of zeal. Therefore in cases involving doubt it is always advisable to take legal counsel before proceeding to extreme measures.

The efficiency of a board of health and the respect which will be shown it in a community will depend very much upon the firmness with which the members insist upon a strict compliance with all needful sanitary regulations, as well as on the caution they display in avoiding needless exactions and unnecessary investigations.

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* Schuster *v.* Met. Board of Health, 49 Barb. (N. Y. S. C.), 450. † Wood's Law of Nuisances, Sec. 837.
‡ Hanover's Law of Horses, p. 76. § Section 6377, Comp. Laws, 1871.

REPORT ON

GLANDERS

IN MAN AND IN DOMESTIC ANIMALS.

—BY—

HENRY B. BAKER, M. D.,

SECRETARY OF THE

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON DISEASES OF ANIMALS, IN RELATION TO PUBLIC HEALTH.

GLANDERS IN MAN AND IN DOMESTIC ANIMALS.

A REPORT BASED ON COMMUNICATIONS TO THE STATE BOARD OF HEALTH CONCERNING CASES OF GLANDERS OCCURRING IN MICHIGAN.

December 6, 1877, the board of health of Minden township, Sanilac county, wrote to the State Board of Health asking advice in a case as follows: They had ordered a horse diseased with glanders to be killed; the owner of the horse brought an action against them individually, before a justice of the peace, to recover damages. A reply was sent, citing sections 1699, 1700, and others of the compiled laws of 1871 in justification of the action of the board of health, and referring them for advice to the prosecuting attorney of their county. It has since been learned that the board of health was fined twenty dollars and costs (eleven dollars), that they paid the costs and appealed the case to the circuit court, and that the case was then "dropped," the prosecution being "anxious to give it up," and the defendants "not willing to put the township to expense."

May 20, 1879, Dr. E. P. Christian, of Wyandotte, Wayne county, a regular correspondent of the State Board of Health, wrote, asking what authority exists for destroying a glandered horse, mentioning a recent death of a person in Dearborn from the disease contracted from a horse, and stating that there was at Wyandotte a badly diseased horse. The communication was at once referred to the committee on Contagious Diseases, and to the committee on Legislation in the Interests of Public Health. An opinion by the last named committee, Hon. LeRoy Parker, of Flint, that a glandered horse may properly be destroyed by the local board of health, is printed on page 300 of this Report, and quoted on subsequent pages of this paper in connection with the question of the need of further legislation in this State to prevent the spread of the disease and the recurrence of such sad cases as are herein reported by Drs. Christian, Duffield, and Post. Dr. Christian's communication is as follows:—

INQUIRY AS TO AUTHORITY TO DESTROY A GLANDERED HORSE,—COMMUNICATION FROM DR. E. P. CHRISTIAN, OF WYANDOTTE, MICH.

WYANDOTTE, May 20, 1879.

H. B. Baker, Secretary:—

MY DEAR DOCTOR:—The question has arisen here as to whether any authority exists for destroying a glandered horse, and who has authority if any exists. The disease is one certainly dangerous to individual health, and endangers other animals.

There has been a late lamentable case of death from this disease, contracted from the horse at Dearborn, in this county, under care of Dr. Duffield. The question arising here over a badly diseased animal, said to have the glanders, suggested calling attention of the State Board of Health to the matter.

Very truly, DR. E. P. CHRISTIAN.

A detailed report of the case of glanders in a human being, in care of Dr. S. P. Duffield, of Dearborn, Wayne county, referred to by Dr. Christian, was by request received from Dr. Duffield, as follows:—

A CASE OF ACUTE GLANDERS IN A MAN TWENTY-FIVE YEARS OF AGE,—REPORTED BY

SAMUEL P. DUFFIELD, A. M., M. D., Ph. D.,

OF DEARBORN, MICH.,

PROFESSOR OF TOXICOLOGY AND MEDICAL JURISPRUDENCE IN THE DETROIT MEDICAL COLLEGE.

[It was intended to publish the principal part of Dr. Duffield's report; but as it has since appeared in one of the medical journals of the State, only an abstract can here be given. The full report may be found in the Detroit Lancet for December, 1879, vol. III., pages 245–8. The abstract is as follows:—]

April 18, 1879, a strong, able-bodied man, 25 years old, 6 feet high, of light complexion, called on Dr. Duffield, complaining of pain in the chest, which was increasing. Examination of the chest by auscultation and percussion: sounds normal, air entering left lung, of which he complained, equally as well as the right, and with no change in the respiration; no dullness on percussion, no difficulty of breathing. He complained only of pain, and severe pain on inspiration. On attempting to raise or extend the left arm he complained of pain. No increase in temperature, thermometer 98½° F. after being four minutes in the arm-pit. Dr. D. prescribed for pleurodynia; and the man returned home, a distance of 7 miles. He was taken with such severe pain in the chest about midnight, that he sent for a nearer physician. He grew rapidly worse, and on Wednesday evening, April 23, Dr. D. was again called. He found the following condition: pulse 134, temperature in arm-pit 102½°, profuse sweating, no odor to perspiration, right knee swollen, with an erysipelatous blush, unlike inflammatory rheumatism, and which with an erysipelatous swelling on the forehead that closed the eyelids, was considered indicative of erysipelas. There was great depression of vital power. The man's father said he had been on a fishing excursion and had caught cold, that he had not been exposed to small-pox, and had never had syphilis. The next day, under the influence of the medicines given, his pulse was reduced, and he expressed himself as easier, and seemed cheerful. Dr. Duffield's report continues as follows:—

"On the 25th he grew rapidly worse, and phlyzacious pustules came out upon the face, degenerating into a peculiar form of ulcer, a flat oblong ulcer, secreting a thick yellow caseous pus, with a defined red margin, but not elevated much above the true skin; the forms of these ulcers were *rarely round*, mostly oblong or elliptical, and their modes of growth entirely different from the pustules of variola, although to the laity and careless practitioners *when at their height* they might possibly be mistaken for variola. These pustules began to come out on the eyelids and face and chest on the 25th (the 7th day of the disease); on the 26th they began to appear upon the back. I noticed also on the 7th day of the disease large bullæ formed in the deep fascia of the arms, five on the right arm—three on left arm, and one on right clavicle, 2 inches from acromial articulation; they varied in size from a pullet's to a hen's egg, and when I lanced them gave up a thin unhealthy fetid pus.

"On the 26th these bullæ and ulcers were of such a character that I pronounced the case one of 'acute glanders' and so spoke to his brother, who denied having any horse which ran at the nose. I ordered the brother to come for me very early the next morning with their sick brother's team, as my horses had been overdriven and I wished to rest them, and told him to be sure and come early, which he did, at 4 o'clock A. M.; and before drinking a hot cup of coffee I put Ziemssen's volume into his hands, opened at the symptoms of glanders, and said, 'You would not believe me that your brother has glanders,—now read there while I take a cup of coffee.' On my coming back to the office the brother said, 'Now, doctor, do you mean to say

you are sure my brother has the glanders?' I said, 'Yes, and what is worse, there is no hope of saving him; he will die.' 'Well,' said he, 'now that you insist upon it being 'glanders,' I will tell you my brother traded horses with a horse-dealer by the name of Norris, and that horse runs at the nose; I have him outside.' I went out and examined him, and found, according to the facts laid down by Youatt and others, that he was a glandered horse in what is called the latter stage of the disease. I ordered my man to destroy the post to which he had been tied, and cautioned the young man not to water his horse along the public road, for fear of extending the disease to other horses. Of course I ran a risk riding behind the horse, which ever and anon kept snorting a miserably fetid, greenish pus from his nostril.

"On the 27th there appeared gangrenous spots upon the inflamed knee, upon the large toe of the right foot, on the large toe of the left foot, and on the toe next to it. Gangrenous spots appeared in the sore upon the forehead. As yet no discharge from the nose. On the 28th the whole system gave evidence of the intensity of the virus. He was maniacal, driving his horses in a swamp, from which in vain he strove to extricate them.

"The discharge from the nose set in this day, and rhinoscopy showed ulcers on the 'septum nasi,' and they were beginning to appear in the 'pharynx,' and upon the 'velum palati,'—all bearing the same character, looking somewhat like a syphilitic ulcer, but having such a definite appearance that having been once seen they need never be mistaken. His pulse was 134, temperature in axilla 104½°.

"On the 29th, in the morning, his pulse was 165; he was still able to sit up in bed, in fact got out of bed in his delirium and was with great difficulty persuaded to go back. His wife, father, and sister, who had tenderly cared for him under careful restrictions I had given them to avoid touching him directly with their hands, asked me if he had any chance for life. I shook my head, and on hearing them mourning he broke out in his delirium and ridiculed any such idea as his being in a dangerous condition. I strove to get him quieted long enough to take his temperature, but he was so restless, snorting the vile fluid from his nostrils and hawking and spitting from his throat, that I took the thermometer away after it had remained only about 3 minutes, fearing for my own personal safety. The temperature was 105°. I am certain it was higher.

"Œdema of the glottis had already set in, and two hours from the time of my taking his temperature he was dead. He died on the 15th day of the disease, not counting prodromata.

"In conclusion, I would call attention to the fact that, in the beginning, with the exception of a slight excoriation between the thumb and fore finger, there was no sore or other diagnostic points by which glanders would have been suspected; and if we wait until we can say positively that it is 'acute glanders' it is then too late to save the patient, for the poison has entered his blood. * * * The wife of the patient informed me that he had, while plowing, excoriated the skin between the thumb and first finger, and had complained of its not healing readily; but when I saw him it had healed up, leaving a reddened scar. * * *

"In view of this case, I think it would be well for the State Board of Health to compile facts from Ziemssen and Virchow's Geschulüstlehrer into a cheap monograph, and place one or two in every town library, in order that farmers may have an intelligent view of the subject; for there are old practitioners of medicine here who deny that this case was glanders. '*Because*,' said one (a practitioner of over 30 years), 'he would not have died *under a year*,' evidently believing there was no such thing as '*acute glanders*,' and believing only in the chronic form. If, therefore, practitioners are ignorant on this disease, where must the people be? At present we cannot destroy any animal that is glandered; there is no law touching the case.

"I advised the father to bring a veterinary surgeon, one from Ypsilanti and one from Detroit. Both pronounced the case of the horse 'glanders,' and yet a German wanted to buy him,—he thought he could cure him.

"There is a 'nest of glanders' in the city of Detroit which as soon as the law will allow should be thoroughly searched and purified. No one's horse is safe until this is done. Gentlemen may sneer and say, 'We have never seen a case of glanders, therefore it is not frequent;' but that does not follow that it will not be. The history of the French army in years gone by proves this.

"I know of no more horrible death to a human being. The face under the ravages of the disease becomes sadly changed. The forehead and nose are red and swollen; both eyes closed with tumefaction and ulceration, eschars surrounded by a livid œdematous border,—all contributing to the awful mutilation of the features;

coupled with this comes the terrible odor of the breath and the involuntary discharges, to complete the picture of this incurable disease.

Dearborn, Mich., July 7, 1879. SAMUEL P. DUFFIELD.

From these communications it is evident that the disease demands the earnest attention and prompt action of local boards of health in Michigan, and of all authorities by whose action it may be suppressed and eradicated. If anything further could be considered necessary to prove the need for such action, it may be found in the fact that on the 10th of August, 1879, an aged citizen of Troy, Oakland county, a county adjacent to Wayne county, died from the same disease. From Dr. J. A. Post, of Birmingham, who had charge of this case, a detailed report of the case has been obtained. It is here inserted as showing one way in which the disease may be communicated from horse to man, and as showing the reality of the danger which it is one aim of this report to point out. Dr. Post's report is as follows:—

A CASE OF ACUTE GLANDERS IN MAN, REPORTED BY DR. J. A. POST, OF BIRMINGHAM, OAKLAND COUNTY, MICH.

Squire Trumbull, aged 73 years, weight 200 lbs., a strong, vigorous man of the sanguine temperament, first came to consult me at my office, a distance from his home of four miles, in regard to his hand, on July 28th, 1879.

Upon examination, I found the left hand badly swollen, the swelling extending along the arm to the elbow. On the back of the hand was a slight wound, or abrasion of the skin, which looked angry and inflamed and was oozing a thin, watery substance. There was no constitutional disburbance, and I feared erysipelas, as nothing was said at this time of his having been exposed to glanders. I prescribed for him and he went home. The next day I was called to visit him at his house, and found him upon his bed, temperature 102°, hurried respiration, complaining of great pain in his hand, along the arm, and in his lower limbs, not in the joints, but in the muscles of the thighs, and the calves of his legs. One point, about the middle of the convex portion of the clavicle, same side as the inflamed hand and arm, was intensely painful and very sensitive to the touch, though not at this time swollen or red. He said he had had several chills during the night. I then learned the following history of the case: He had a glandered horse which he had been treating and handling for several weeks past, and about five days before I saw him, he hurt the hand, "knocked the skin off," as he said, and feared he might have poisoned it from the horse.

Upon questioning him, I learned he had been in the habit of syringing out the horse's nostrils, and while doing so threw a blanket over the animal's head, furnishing abundant opportunity for inoculation. The hand began to swell and look inflamed the second day from the date of injury.

I visited him from this time on, twice a day until his death, which occurred on the 14th day from the time of his visit at my office. The symptoms continued much the same for the first week, only that they gradually increased in severity. The temperature ran higher, often reaching 104° at night, but in the morning dropping to 102°. The respirations increased in frequency, and were, towards the last, fifty per minute. The tongue was coated with a white fur, which toward the end of the week became dry, but never brown. The pain over clavicle, and in the limbs, was constant and severe, so that I was obliged to keep him continually under the influence of chloral and opiates. There was also rapid and extreme prostration. About the 10th day of the fever began to appear the first signs of any eruption. This was of a mixed character. There were blotches, not raised from the surface, round or oval in shape, and nearly the size of a small three cent piece; color dark red or purple. These were not numerous, and made their appearance mostly upon the lower limbs. Then there were pustules of different sizes, filled with matter or pus, which came out all over the body, some upon the face, and many upon the abdomen and limbs, and more numerous than either of these, pimples, or red points of inflammation, that never proceeded to suppuration. Interspersed among these were hard bunches, or phlegmonous tumors, about the size of a filbert. The skin over these became red, and they were very painful upon pressure, but never suppurated.

There were probably twenty of these, large and small, some upon the limbs, others on the abdomen, one large one upon the right foot.

Toward the termination of the disease, the tender, painful spot over the clavicle became much swollen and inflamed; but it remained hard, and never had any appearance of suppurating. The right leg and foot were very much swollen, and for a few days before he died were so painful that he could not bear the weight of the bedclothes upon them, and they could not be moved without causing him to cry out with pain. The eruption, which was at first sparse or scattering, soon became more profuse, and at the last the body was literally covered with it in its various forms. No part seemed exempt. The mind was generally clear, though at times there was some delirium, and for several days before death there was much jactation and *subsultus tendinum*. At no time was there any appearance of the disease affecting the *nasal passages*, though at times he would expectorate a yellowish substance, evidently from the bronchial tubes, and possibly from posterior nares, but not to any great amount.

He died on the 10th day of August, about noon, a most pitiable looking object, and was buried a few hours after, without being laid out or dressed, being lifted into the coffin upon the sheets and bedding upon which he lay.

J. A. POST.

Birmingham, Mich., Sept. 23, 1879.

The communication of the disease to man is not a rare occurrence, as may be shown by statements from other localities where it has prevailed. The following quotation is from the *Sanitary Journal.* of Toronto, for September, 1879 (vol. iv., page 53):—

A PROSECUTION FOR HAVING A GLANDERED HORSE AND NOT GIVING THE NECESSARY INFORMATION.

"A death from glanders recently took place in St. Mary's Hospital, London, England, and at the Police-courts several persons were summoned for having glandered horses in their possession without giving the necessary information. Mr. Paget, the magistrate, told one of the defendants 'that a glandered horse was more dangerous than a mad dog; and it was perfectly monstrous that this loathsome disease should have been allowed to exist in the number of cases now brought to notice, with all the risks which each one entailed upon the community at large.'"

The following from the *Sanitary Record,* of London, for May 2, 1879 (pages 277–278) possibly refers to the same case. It certainly shows a deplorable ignorance in regard to the disease or else a criminal disregard, neither of which, it may be, is without a parallel in this country:—

"A death which recently took place in St. Mary's Hospital from glanders has furnished matter for a somewhat protracted inquiry, and the evidence brought forward is of more than usual interest. It appeared that Emily Hulbert (18), the deceased, resided with her parents and other members of the same family at No. 16 Colville Mews, Kensington; the whole family occupying apartments over stables belonging to a Mr. Bacon. The sanitary officer of the Metropolitan Board testified to having received information of an outbreak of glanders at 16 Colville Mews, and on visiting the premises he found several horses undoubtedly suffering from the disease. Mr. Woodger, M. R. C. V. S., bore witness to the infectious nature of glanders, and the possibility of its being conveyed by the atmosphere to human beings. A man who styled himself 'a dealer in live and dead horses,' a licensed slaughterer, and other witnesses called, proved that glanders had for a long time past been no stranger at Bacon's stables. Indeed, there seems to be hardly room for doubting that glanders existed in an endemic form in these unfortunate stables, nor was the subject of the inquest the first member of the Hulbert family who had succumbed to the disease. After a very patient and careful consideration of the evidence submitted, the coroner's jury found 'that the deceased expired from the effects of glanders contracted at 16 Colville Mews, Kensington, her sister having previously died from the same disease;' and to this verdict the jury added an expression of opinion that the Contagious Diseases (Animals) Act of 1878, with reference to the outbreak of glanders, and to the treatment and exposure of carcasses of horses suffering from such disease, and the provisions of the metropolitan Slaughter-Houses Act, 1874, had not been duly

carried out, and 'further desired that the facts given in evidence should be brought before the Privy Council, and such steps taken so as to avoid the occurrence of such accidents for the future.'

"We sincerely trust that 'such accidents' as are incidental to the herding of human beings in lofts over stables tenanted by glandered horses may indeed be avoided in the future, but we fail to see how a representation to the Privy Council can effect much. Here is a father who, after having lost one child from glanders, continues to occupy infected premises, and who does not seem to have made any attempt whatever to protect himself and those dependent on him from the further operation of the insidious poison at his door. How is Government to protect people of this type, who will not raise a hand to help themselves? However, there can be no doubt that fatal cases of glanders are very properly made the subjects of official inquiry, as tracing the circumstances under which they arise is at least the first step towards preventing their recurrence."

The Annual Report of the Connecticut State Board of Health for the year 1879 states that several cases of glanders in horses occurred in Hartford, Conn., in that year, and that in Waterbury, Conn., occurred a fatal case of glanders in man. Prompt action on the part of the State and local health authorities secured the destruction of the diseased animals, either by the voluntary act of the owners or as declared public nuisances.

Because of the importance of the subject, and as more fully representing the danger to which men are exposed where glanders exists in horses, other cases of glanders in man are quoted, and quotations from standard authorities are made relating to the fatality, causes, and symptoms, of glanders and the modes of its spread, as preliminary to a discussion of its restriction or extermination in Michigan.

FATALITY OF GLANDERS IN MAN.

Glanders in man is almost always incurable in its acute form, and in about one-half the cases in its chronic form. Prof. Bollinger says:—

"In 38 cases of acute glanders, recovery ensued in 1 instance.

"In 7 cases of subacute glanders, recovery ensued in 2 instances.

"In 34 cases of chronic glanders, recovery ensued in 17 instances.

" * * * Out of a total of 120 cases of glanders (including the above 79, differently classified according to their duration), that I have succeeded in finding, there were 28 recoveries, equivalent to 23 per cent. Hauff, out of 70 cases collected by him, was able to report but 8 recoveries, equivalent to 11.4 per cent. According to Küttner, cases of infection from a fixed contagium have a decidedly more favorable chance of recovery than such as are induced by the volatile poison.

"In view of the above figures, we are able to pronounce the prognosis in acute glanders as unconditionally unfavorable, the result being almost invariably fatal. * *

"When the disease has continued for some time the prospect for recovery becomes decidedly favorable, and this point, in a therapeutic point of view, cannot be overestimated in importance."—*Ziemssen, vol. III., page 368.*

Concerning the fatality of glanders in men, the following is quoted in the August, 1879, number of the *Physician and Surgeon* (Vol. I., pages 354–5), published at Ann Arbor, Mich., from Schmidt's *Jahrbücher*. It is also of interest as stating means of actual communication of the disease to man.

"Burkmann reports a case in which a soldier received a superficial wound extending from the root of the nose up over the middle of the right eye-brow, by a cut from a whip whose owner had a horse with the glanders.

"On the sixth day the wound was partly covered with a scab, while the other part poured out thin pus. The surrounding skin was red and slightly swollen. At the same time there was a high fever, and the greatly swollen joints of the upper extremities pained the patient exceedingly. On the eleventh day there appeared in the vicinity of the joints of the hand and foot of the right side, on the dorsal surface, bluish-red spots about four centimeters long and two centimeters broad. On the

twelfth day these spots were swollen but not sharply defined from the surrounding tissues. On incision there poured out a thin, yellowish-red fluid. The edges of the wound remained soft. On the thirteenth and fourteenth days the fever abated somewhat, but again arose, and at the same time the tissues surrounding the wound on the forehead continued to swell. On the nineteenth day there appeared, on the upper part of the nose and around the right eye where it was greatly swollen, small bluish-red blisters which contained a dark fluid. On the twentieth day the skin around the wound was perfectly black, and new abscesses appeared on the extremities; however, the swellings on the joints were not so great. On the twenty-fifth day, the left half of the forehead was also swollen and erysipelatous, also the upper lip was swollen and covered with pemphigus vesicles. Spontaneous diarrhœa had set in on the fourteenth day and continued. Later there was a dry cough and dyspnœa. From the nostrils there flowed a reddish turbid fluid. Death took place on the twenty-sixth day after the infliction of the wound. Post-mortem examination showed that the left lung contained two sacks of pus as large as walnuts, and several smaller ones.

"The second case, reported by Burkmann also, was that of a cartman, forty-seven years of age, who had inflicted a wound upon the second joint of the little finger of the left hand, by striking it against the door of a stall in which a horse had been killed about fourteen days before on account of disease. The patient was first seen by Dr. Burkmann in consultation about twenty days after the receipt of the injury.

"On the day of the consultation the wound was healed, but the joint was but slightly moveable. On the inner side of the left thigh there were two abscesses, and one in the same position on the right thigh. These abscesses were partially covered by the skin. The surrounding tissue was not hard, but was covered by pale bluish-red skin and was slightly painful. On making an incision, a reddish-yellow, pus-like mass flowed out. The general health, apparently, was not deranged. After this the Doctor noticed on the anterior surface of the right forearm a hard, dark-red tumor, which was opened four days later, when a reddish, watery fluid flowed out. All the abscesses suppurated badly, but the fever remained moderate. Eight days later the back of the left hand was swollen, red, and painful; the wound on the small finger again broke out and the fever became higher. Thirteen days later the right knee was swollen and painful, while the affection of the upper extremities was aggravated. In four more days there was a rapid increase of the fever and delirium. Erysipelas appeared on the left side of the nose, and on the next day the left eye-lids were greatly swollen. The skin of the forehead was covered with bluish-black vesicles, and a brownish fluid flowed from the left nostril. There was difficulty of breathing over the left lung, from the base of the scapula. Bronchial breathing and rales were also noticed. There was dyspnœa and dry cough without bringing up anything. Death occurred on the fifty-first day after the injury. Post-mortem examination was not allowed.

"It will be seen that in both these cases the contagion entered through the wound and that it was permanent. Eruption from the mucous membrane of the nose was the final result in both cases. The cases also prove that the mucous membrane is not necessarily the first portion affected. Finally, they show that external indications of the introduction of the poison do not first appear near the place of introduction; moreover, that the disturbance of the general health follows, it matters not where the poison is introduced.

"A third case similar to those already given is reported by Dr. Scheby-Buch in the *Berlin Klinische Wochenschrift.—Schmidt's Jahrbücher.*"

HOW GLANDERS IS COMMUNICATED TO MEN.

It is important to know the sources of danger, in order to be able to avoid them; it is therefore important to note particularly the different ways in which glanders is communicated to men. Besides the cases mentioned in the article just quoted, in which the infection was received by a cut from a whip whose owner had a glandered horse, and by bruising the finger on the door of a stall where a glandered animal had been kept, the case reported by Dr. Post, in which the virus probably entered through a bruise of the hand, and the cases of infection of persons living over a stable where were glandered horses, mentioned in the quotation from the *Sanitary Record*, in Dr. Duffield's report

the danger is pointed out which one incurs by riding behind a glandered horse. When such a horse in rapid motion snorts forth the contagious matter it may be carried directly in the faces of persons riding behind, and thus come in contact with some scratch and cause the disease; or in a finely divided condition some of the contagious matter may be breathed in by persons riding behind or walking near a glandered horse. The following quotation from *Cole's Diseases of Domestic Animals,* published in Boston in 1847, (pages 120–1) mentions other methods of the communication of glanders to man:—

"In Paris, a groom slept in a stable occupied by a glandered horse; some days after the death of the horse, he was attacked with the same disease, characterized by pustular and gangrenous sores over the whole body. He died, and with some matter from the sores a foundered mare was inoculated, and she had a true case of the glanders, of which she died. A young groom was in the habit of wiping the face of a glandered horse with his pocket handkerchief; he caught the disease, of which he died in dreadful agony, every bone in his head becoming carious. * * *

"It was stated in an English paper, in 1844, that since the year 1838, no less than thirty persons had sunk under this terrible malady, which counted as many victims as patients. * * *

"A student lately died in Paris of glanders, contracted by cutting himself while dissecting a glandered horse at the celebrated veterinary school of Alfort. He had the best medical aid from the beginning."

As would be expected, the disease occurs most frequently among those who by their occupation are most exposed to it, though no one can be considered safe in a community where a glandered horse is permitted to live. The author of the article on "Infection by Animal Poisons," in *Ziemssen's Cyclopædia of the Practice of Medicine,* Prof. Otto Bollinger, of Munich, says (vol. III., page 352):—

"In 106 cases of glanders collated by me, there were found to be:—
41 hostlers,
11 coachmen, drivers, or postilions,
14 land-proprietors and horse-owners,
10 veterinary surgeons and students in veterinary medicine,
12 horse-butchers and flayers,
5 soldiers,
4 surgeons,
3 gardeners,
2 horse-dealers,
1 each: policemen, shepherds, blacksmiths, employés at veterinary school.

" * * * The female sex constituted only five per cent of the cases of glanders, six only out of 120 cases being found to occur in females. The infected women were for the most part maids who were obliged to take care of diseased horses, or the wives of hostlers and drivers, the communication of the virus being accomplished through the agency of an intermediate object.

"In like manner children enjoy still greater immunity from infection. Out of the same 120 cases one diseased child only was found, and that proved to be the child of a coachman who had been brought in contact with glandered horses."

COMMUNICATION OF GLANDERS BY INFECTED MEAT.

"There can be no doubt but that the infection of glanders may be produced by *eating the meat* of glandered horses, which, according to my experience, owing to the imperfect sanitary regulations for the inspection of meat, is not unfrequently used as food. The common processes for preparing the meat for the table would naturally tend, it is true, to destroy its virulence; but meanwhile the risk of infection is incurred by the manipulations involved in preparing it."—*Ziemssen, Vol. III., p. 350.*

This suggests the necessity for some safeguards, by competent inspection or otherwise, against the admission of glandered meat to the markets, particularly as sheep are especially susceptible to glanders, and as rabbits and swine have been known to be infected with the disease.*

* Ziemssen's Cyclopædia, vol. III, p. 332.

Great care should be exercised that no one be placed in danger of contracting the disease by any disposition that may be made of the carcass of a glandered animal. It is stated that in France the hide of a glandered horse is slashed to render it worthless, as the disease may be conveyed by that; and if the carcass is then properly destroyed this seems a much safer way than to attempt to remove the hide, and in fact the only proper way.

COMMUNICATION FROM MAN TO MAN.

The necessity for caution against contracting glanders on the part of those having care of a person sick with it, appears by the following statement from Prof. Bollinger, on page 351 of the volume of *Ziemssen* already quoted:—

"The communication of glanders *from man to man* has been known to occur in extremely isolated instances only, for example where one has eaten from the same dish with a diseased individual, or when an entire family, consisting of man, wife, and four children, have been rapidly attacked, one after another, with the malady."—*Ziemssen, vol. III., page 351.*

HOW THE VIRUS OF GLANDERS ENTERS THE BODY.

The virus of glanders may enter the system through wounds of the hands, cuts, bruises, scratches, cracks, hangnails, etc., of one engaged in grooming or feeding a glandered horse, or in any way handling it, whether dead or alive. It may enter the system through the mucous membrane of the nose, mouth, or eyes, by means of particles of mucus, pus, or saliva, snorted on these organs or in any way brought in contact with them. Infection has taken place by the bite of a glandered horse. Infection has been observed where there was no abrasion or wound, and where the poison must have penetrated the skin through the cutaneous follicles. It has taken place by drinking from a pail that had been used by a glandered horse, wiping a wound with an infected blanket, or by using a handkerchief that had been used to cleanse the nose of a diseased horse. Another mode of infection is by a *volatile* poison, and to this must be referred all cases in which the general constitutional disease precedes any localization of the symptoms. Infection often occurs by this method in those who have care of a glandered horse, who sleep in a stable with diseased animals (without coming in direct contact with them), or who sleep on straw on which glandered horses have stood. Infection may occur by eating the meat of a glandered animal.*

A newspaper item is as follows:—

"A Grand Rapids milkman has been detected in filling up his cans with water from a horse-trough. Good way to spread the glanders, with all its physical horrors and certain death."

PERIOD OF INCUBATION.†

When a person knowing himself to have been exposed in any way to glanders has any reason to suspect that he may have contracted the disease, he should, of course, at once place himself in the best possible medical care. Of the time which may elapse between the reception of the contagium into the system and the onset of the disease, Prof. Bollinger says (Ziemssen's Cyclopædia, vol. III., pages 352–3):—

"*Incubation.*—When the infection of glanders has once taken place, either by the transfer of the fixed *materies morbi* to an abraded skin or mucous membrane, or by the agency of the volatile poison, drawn in probably by the act of inspiration, there will be observed a prodromal stage lasting from three to five days, but which is said to be prolonged in many instances to fourteen days, and even three weeks."

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* *Ziemssen*, Vol. III., pages 349-351.

† This may be compared with what is stated on a subsequent page under the head of incubation of glanders in horses.

SOME SYMPTOMS OF GLANDERS IN MAN.

Many of the symptoms of acute glanders are detailed in the preceding accounts of actual cases reported by Drs. Duffield and Post, of this State, and the two cases quoted from the *Physician and Surgeon*. In chronic glanders, if confined to the internal organs, it seems to be impossible as yet positively to identify the disease,* which is in many respects similar to, if not identical with, what is commonly known as consumption. When the disease appears in the nose, and especially if the tubercles appear on the skin, the disease is much easier recognized, and with most certainty where it follows immediately upon an injury known to involve liability to inoculation of the disease.

"The *initiatory symptoms* consist frequently of malaise, fatigue, and prostration accompanied by headache and chills, and often joined with obscure pain in the extremities, especially in the muscles and joints. While at the outset of the disease no appreciable cause for these rheumatic pains can be made out, distinct local symptoms soon appear on the skin or in the muscles, in the form of circumscribed or diffused lesions. * * *

"Meanwhile the ulcer enlarges, its edges and base acquire an unhealthy aspect, the pus discharged being of an offensive character; often the whole ulcer assumes a corroded, chancroid character, and a dirty white hue. If the wound is situated on the finger, there is often observed a swelling of the arm, at times of a phlegmonous and erysipelatous form, accompanied frequently by a formation of pustules and ulcers."—*Ziemssen's Cyclopædia, vol. III., page 354.*

FARCY OR EXTERNAL GLANDERS IN MAN.

On this subject Prof. Virchow says:—

"'At first these spots are much reddened, but very small, almost like flea-bites; then papular swellings are formed; the surface of those swellings rises gradually rather in the shape of a round and solid elevation than of a pustule, and assumes a yellowish color, which gives it a pustulous appearance. If the epidermis is removed from such a flat roundish papule or nodule, which is not depressed in the center, but surrounded by a swelled and reddened court, a puriform, moderately consistent yellowish fluid is formed, which contains but few organized constituents, and consists mainly of the decayed elements of the formerly solid nodule. The fluid, therefore, is not lodged in a pustulous elevation of the epidermis, but in a small hole in the corium, which penetrates the latter as if it had been made with a punch. After some time the fluid (matter) becomes colored by hemorrhagic admixture; still later its color is changed to bluish red, and finally small brown or blackish crusts or scabs are formed. Such eruptions appear sometimes in enormous numbers on the whole body.'—(Gerlach's Treatise)."—*Delmers on Glanders, page 263.*

DURATION OF ACUTE GLANDERS IN MAN.

"In twenty-eight cases of acute glanders, of which number one only did not terminate fatally, the average duration, not reckoning the period of latency, amounted to 16.5 days. Instances in which the duration was from seven to eight days are rare."—*Ziemssen's Cyclopædia, vol. III., page 354.*

GLANDERS IN OTHER ANIMALS.

Glanders occurs in asses and mules as well as in horses. The only domestic animal that seems to be exempt is the ox. Sheep are especially susceptible to glanders. Goats, dogs, cats, prairie dogs, polar bears, lions, rabbits, guinea-pigs, mice, and swine have been known to be infected with the disease.†

The apparent exemption of the ox, mentioned above, may be only apparent. If it turns out to be true that what has been called tubercular consumption in the ox is really identical with chronic glanders in the horse, the apparent exemption will disappear; for, according to the statements of veterinarians, "Tuberculosis, or consumption, is one of the most common diseases of cows and working oxen, as well as of people. M. Cruzel, an excellent French authority, says: 'It exists with at least half of the oxen which have been

* This may be compared with what is stated in the third paragraph on page 320 of this Report, relative to chronic glanders in the horse; also with the first paragraph on page 317, relating to man and animals; also with the last sentence in the first full paragraph on page 307, of this Report.

† Ziemssen, vol. III., p. 332.

worked to an advanced age; it is still more common with cows employed at field work; and it is not less frequent with milch cows.' M. Adam, of Augsburg, states that in every one thousand animals, over one year old, brought to the slaughter-houses of that city, there are, on an average, fifty-two affected with tuberculosis. In our own country, having no competent inspectors of slaughter-houses, we cannot speak with certainty, but the frequency with which such cases are met in cattle practice makes it evident that a large number of such animals must be butchered and consumed as beef each year."—*D. E. Salmon, D. V. M., in the Scientific Farmer, Jan. 1879.*

GLANDERS IN HORSES.

Because glanders in man is so frequently derived from glanders in the horse, its prevention in man depends to a very great extent on preventing the disease in horses. It is, therefore, important that the disease be recognized at its first outbreak among animals in any place; and, in order that its communication to man or to other animals be properly guarded against, that the modes of its communication be well understood; and that there be a general knowledge of the means necessary to its extermination when once it has appeared.

EARLY HISTORY.

Glanders in horses is first mentioned by a surgeon in the army of Constantine the Great, in the fourth century; in 1682 Van Helmont referred to it the origin of syphilis; its contagious character was recognized as early as 1664. Attempts have been made to connect glanders with diphtheria, with pyæmia, with scrofula, and with tuberculosis. It seems to occur among horses everywhere.*

GEOGRAPHICAL DISTRIBUTION OF GLANDERS IN HORSES.

The author of the article in Ziemssen's Cyclopædia says (vol. III., pages 332–3):—

"Glanders appears to occur among horses in all localities where these animals are found, while its dissemination and frequency in the different countries of Europe depend chiefly upon the sanitary measures adopted by local authorities. In cold climates (*e. g.*, Sweden) it prevails as extensively as in hot regions (Algiers, Tunis, Tangiers); in Java it is of common occurrence.

"Dupuy (compare Vines) erroneously supposed glanders to be unknown in hot climates. In countries where there exist properly qualified medical boards, and efficient sanitary regulations capable of dealing with the infectious diseases of animals, the animal mortality from glanders is comparatively small. Hahn calculates from statistics kept for a period of nine years, that 175 horses are annually destroyed in Bavaria by glanders (equivalent to four per cent†, estimating the entire number of horses in that country at about 400,000). Up to the middle of the present century glanders raged in the French army to such an extent that when the rate of annual mortality amounted to 75 in a thousand, 35 of these deaths resulted from this disease. Not until the idea of curing the disease was abandoned, and its contagiousness was gradually recognized, did the total mortality fall from 75 to 44.5 in a thousand, and the number of those affected with glanders from 35 to 20.2 in a thousand (Casteinau).

"Glanders prevailed in France in the form of an epizoötic in 1776, 1807, and 1808 (Erdt, P. 61). At Mezöhögyes, in Hungary, in one of the largest studs in Europe, glanders raged in the form of an epizoötic from the year 1808 to 1816, to such an extent as to cause the death of nearly 20,000 horses. In the year 1812 alone, as many as 12,000 were killed in consequence of being glandered. This immense loss is to be attributed to the fact that the contagious nature of the disease was not suspected."

* Ziemssen, vol. III., pages 317-9.

† [175 is only four-hundredths of one per cent of 400,000.—H. B. B., Sec. S. B. of H.]

Some idea of the prevalence of glanders in animals in Great Britain may be gained from the following quotation from the *Annual Report of the Veterinary Department of the Privy Council, for the year 1877, pages 54–5:—*

"From the inspectors' returns it may be concluded that glanders and farcy were considerably less prevalent in Great Britain in 1877 than they were during the previous year.

"In 1877 reports of the existence of glanders were received from 38 counties in Great Britain, viz., 29 in England, 6 in Scotland, and 3 in Wales. 378 fresh outbreaks occurred in Great Britain. 494 animals were attacked, 5 remained diseased from the previous year, 487 were killed, 8 died, 2 recovered, and 2 remained diseased.

"Reports of the existence of farcy were received from 15 counties in England. 140 fresh outbreaks took place. 264 animals were attacked, 11 remained diseased from the previous year, 254 were killed, 3 died, 10 recovered, and 8 remained diseased.

"No reports of farcy were received from either Scotland or Wales during 1877."

In a letter dated March 6, 1880, A. J. Murray, Veterinary Surgeon, of Detroit, Michigan, says:—

"I have repeatedly been called on to examine cases of glanders lately; and as I make it a point to ascertain, if possible, how the disease was contracted. I have received information as to other cases which I have not had an opportunity of examining personally. I see so much loss arising from this disease that I hope something will be done in the matter during the next sitting of the Legislature."

SYMPTOMS AND DESCRIPTION OF DIFFERENT FORMS OF GLANDERS.

The following paragraphs are from a Report on Glanders, by Dr. H. J. Detmers, V. S., of Chicago, Ill., published in the U. S. Department of Agriculture Report on *Diseases of Swine and Other Domestic Animals*, Special Report No. 12, 1879, pages 257–263.

"Glanders is a contagious disease *sui generis* of animals belonging to the genus *equus*. It has usually a chronic course, can be communicated by means of its contagion to several other species of animals and to human beings, and must be considered incurable if fully developed. The principal seat of the morbid process is usually in the mucous membrane of the nasal cavities. Three main symptoms, viz., discharges from the nose, swelling of the submaxillary lymphatic glands, and particularly ulcers of a peculiar, chancrous character in the mucous membrane of the septum of the nose, characterize glanders, and are, therefore, of the greatest diagnostic value. Wherever these three symptoms, or only two of them, are present and fully developed, there the diagnosis is secured. But unfortunately this is not always the case; sometimes two, and even all three, principal symptoms may be wanting, and still the horse be affected with glanders. In such a case the seat of the morbid process is not in the nasal cavities, but further on in the respiratory passages, or even in the lungs. * * *

"NASAL GLANDERS.—This form is that which is most common, best known, and characterized by the three principal symptoms which have been mentioned.

"(*a.*) *The discharge from the nose*, although the most conspicuous of those symptoms, is really the one which is least characteristic, or of the least diagnostic value, because several other diseases of the respiratory organs are also attended with discharges from the nose, which are more or less similar. It is true the discharge in glanders possesses some properties which, if considered as a total, are characteristic and are not found combined in any other disease; but the difficulty is one or another of these qualities is not always sufficiently developed. Consequently, if the other two principal symptoms, the swelling of the lymphatic glands and the ulcers in the nose, are absent or not observed, the discharges from the nose are seldom characteristic enough to serve as the sole basis of a reliable diagnosis. * * *

"(*b.*) *A distinctly limited swelling of the submaxillary lymphatic glands** constitutes the second essential symptom, which is more characteristic of glanders, and of greater diagnostic value than the discharge from the nose. The swelling corresponds to the discharge; that is, if the latter is one-sided, for instance, from the left nostril only, the glands of the corresponding left side of the head are affected, and if the discharge is from both nostrils the glands of both sides are swelled, but always those of that

* [Hard, knotted swelling on the inner side of the blade of the under jaw.]

side the most on which the discharge is most copious. The swelling does not exhibit any conspicuous sign of inflammation, and is usually not painful, except at the beginning or after a sudden increase of the morbid process. It is always distinctly limited, and the swelled gland is always hard and usually of the shape and size of a peanut; may occasionally, however, be found as large as a hen's egg. Large inflammatory swellings without distinct limits do not belong to glanders. At first the swelled glands are more or less movable beneath the skin, but afterwards, in an advanced stage of the disease, the same frequently appear to be attached more or less firmly to the bone and are immovable. The swelling, unless irritated by external causes, never dissolves in suppuration like the inflammatory swellings common in distemper, and is absent only if the lymphatic glands have been extirpated, if the lymphatics have become obliterated, or if the morbid process in the mucous membrane of the respiratory passages is situated too high to be within the province of those lymphatics which are connected with the submaxillary glands, for the swelling is caused solely by a deposit of deleterious matter which has been absorbed by the lymphatics. Professor Gerlach looks upon every horse as probably affected with glanders which shows a distinctly limited, hard, knotty, and painless swelling of the submaxillary lymphatic glands. I will not contradict a man of his experience and learning, and admit that such a swelling constitutes a very suspicious and characteristic indication of glanders, especially if some other symptoms of that disease are also present; but I am obliged to remark that I have seen horses not affected with glanders in which those glands were swelled to the size of a peanut, and were hard, without pain, and movable.

"(*c.*) *Ulcers of a peculiar, chancrous character* on the mucous membrane of the nose, and especially on the septum or cartilaginous partition between the nasal cavities, constitute by far the most characteristic symptom, and, in fact, the only one which makes the diagnosis a certainty, even if all other symptoms should be absent or imperfectly developed. Still, such is never the case; if there are ulcers in the nose, then there is also a discharge of matter mixed with mucus from the corresponding nostril. In some cases these ulcers are present, but are situated too high to be seen unless the horse is examined in bright sunlight and the rays of the sun are reflected by a mirror into the cavity of the nose. The seat of the ulcers is usually on the septum and near the nasal bone. Their size and shape vary. Some ulcers are small, isolated, almost round; others are large, of an irregular shape, and of uneven depth. All produce matter, have elevated, corroded borders, a dirty, steatomatous-looking bottom, and are never covered with a scab. At first small gray specks or elevated gray spots (glanders-nodules), varying in size from that of a pin's head to that of a pea, make their appearance. These nodules soon decay and form ulcers. Gradually the ulcers increase in size and depth; their borders become more elevated and corroded; the process of decay goes on; and if two or more small ulcers are close together, they become confluent, unite, and constitute one large, irregularly-shaped ulcer, which continues to increase in size and depth. Decay and destruction work their way deeper and deeper, even into the cartilage, and if ulcers happen to be existing in both cavities, or on both sides of the septum, it occurs not seldom that the latter becomes perforated. * * *

"(*d.*) *Minor symptoms.*—The three principal symptoms just described are usually accompanied by some others of minor diagnostic value, but under certain circumstances very important, especially if one or another of the principal symptoms should happen to be imperfectly developed. As such minor symptoms, may be mentioned, *First*, An accumulation of a glassy, whitish-gray mucus in the inner canthus or corner of the eye of the diseased side of the head. It is a symptom which usually makes its appearance at the beginning of the disease. *Second*, A lusterless, dry, and dirty-looking, or so-called 'dead' coat of hair. *Third*, More or less difficulty in breathing. *Fourth*, A peculiar short and dry cough, somewhat similar to the cough of a horse affected with heaves. These last three symptoms, of which the cough is the most characteristic, make their appearance only after the morbid process has made considerable progress. In some cases the plain outbreak of the disease, or the appearance of plain and unmistakable symptoms is preceded by a swelling of the inguinal, the axillary, and other lymphatic glands. * * *

"As the principal symptoms of pulmonal glanders are essentially, for some time at least, only such as are also observed in common cases of heaves (one of the most frequent disorders of horses), the diagnosis must frequently be based, as a lawyer would say, upon circumstantial evidence.

"A horse must be suspected of being affected with glanders, *First*, If the peculiar, weak, and dry cough constitutes, compared with the difficulty of breathing, the predominating symptoms; if the animal becomes more and more emaciated and hide-bound, and if the appearance of the coat of hair is such as to indicate the

presence of a cachectic disease. *Second.* If it is known that the animal in question has been exposed to the contagion. *Third.* If other horses have become affected with glanders or farcy, after having been together with the animal that shows those symptoms. *Fourth.* If a horse apparently affected with heaves has previously exhibited other symptoms, more or less characteristic or suspicious, of glanders. *Fifth.* If other symptoms, such as are observed in so-called 'nasal gleet,' or incipient nasal glanders, make their appearance.

"FARCY, OR EXTERNAL GLANDERS.—The name 'farcy' is given to such cases of glanders in which the morbid process has its seat in, and immediately beneath, the skin, and in which nodules, boils (*glanders-buboes*), and ulcers of a very infectious and chancrous character make their appearance in the subcutaneous tissue, and in the skin itself. Glanders-nodules and lenticular ulcers in the tissue of the skin, boils beneath the skin, smaller and larger open ulcers penetrating the same, a strand-shaped swelling of the subcutaneous lymphatics, swelled lymphatic glands, and œdemata, the latter especially in the legs and on the head, constitute the most essential symptoms.

"Professor Gerlach discriminates two forms: Subcutaneous glanders or common farcy, and exanthematous glanders or skin farcy.

"(*a.*) *Subcutaneous glanders or common farcy.*—The morbid process in this rather frequent disease has its principal seat in the subcutaneous connective tissue, and in the lymphatic system of the skin and between the skin and the muscles, but especially on the inner side of the hind legs, on the lips, on the neck, between the fore legs, and on all such places where the skin is thin and fine. At first distinctly limited swellings of an inflammatory character (incipient boils or glanders-buboes) make their appearance in the subcutaneous tissue. These swellings or boils soon commence to dissolve, or to decay, from within; the ulceration begins in the center, but the matter, being very corrosive, soon works its way into the skin, the boil finally opens, and presents a farcy-ulcer with a steatomatous bottom, and elevated, corroded, and inflamed borders. At the same time, or even before the formation of the first ulcer has become completed, deleterious matter is absorbed by the nearest lymphatics, and deposited in the lymphatic glands. The former, in consequence, swell to hard and plainly visible cords or strands, and the latter to painful and distinctly limited tumors. * * *

"The roundish boils or tumors increase in size from that of a hazel-nut to that of a hen's egg. At first, when such a boil is making its appearance, it is not fastened to the skin; the latter can yet be moved a little in every direction over the boil, but soon the neoplastic process and the subsequent decay will extend to the tissue of the skin, and boil and skin will become firmly united before the ulcer breaks and discharges its extremely infectious and corrosive contents, consisting of decaying glanders-cells or matter, and lymph.

"(*b.*) *Exanthematous glanders or skin farcy.*—In this form of glanders or farcy the principal seat of the morbid process is in the tissue and in the lymphatics of the skin or cutis. It is a rare form in horses, but the only one in which external glanders or farcy makes its appearance in a human being. Distinctly limited swellings (nodules and tumors) of the size of a pea to that of a hazel-nut, either isolated, or united and resembling a string of beads, make their appearance in the tissue of the skin. These swellings soon break, and then present round ulcers with elevated and corroded borders. The discharge consists of a mixture of matter, composed mainly of decayed glanders-cells and lymph. In other, though rather rare cases, the swellings are very small and numerous, and present themselves as small nodules, some of which are so small as to be scarcely visible, while others are about as large as common peas. These small swellings, too, are soon changed to ulcers, which are usually flat, lenticular, and constantly suppurating. * * *

"On the human skin, not being covered with hair, the whole process can be observed much better than on the skin of a horse. Professor Virchow's description of skin-farcy in men, may, therefore, find a place."—*Delmers on Glanders, pages 257-263.*

Professor Virchow's description of skin farcy in men, mentioned above, is given on page 312, under the head of Farcy in Man.

"*Glanders-catarrh.*—If the glanders-process makes its appearance in a mucous membrane, the first morbid changes and symptoms are always those of glanders, blended with a catarrhal affection. Consequently the first stages of nasal glanders may appropriately be called 'glanders-catarrh,' and may under favorable circumstances exist almost unchanged for a long time without being attended by any other characteristic symptoms except, perhaps, some swelling of the submaxillary glands (so-called nasal gleet)."—*Delmers on Glanders, page 278.*

"Apart from my own experimental researches, * * which show most clearly that, where glanders is inoculated (in rabbits and goats for instance), the discharge from the nose and other nasal symptoms generally make their appearance as the final phenomena, there may be found, also, in the history of Glanders, as it occurs in the human subject (Küttner), numerous instances in which the nasal lesions were developed only after the chronic affection had already existed for a considerable period."—*Bollinger in Ziemssen's Cyclopædia, Vol. III., page 327.*

PATHOLOGICAL ANATOMY.

Concerning the pathological changes in glanders, Prof. Bollinger says *(Ziemssen's Cyclopædia, Vol. III., pages 333–341):*—

"Glanders is characterized anatomically by the formation of neoplastic growths [new growths which arise from changes in the interior of cells, or from simple division of cells,] which appear either in the form of circumscribed tubercles developed in parts for which they have a peculiar affinity, or else as diffused infiltrations in certain organs. * * * The neoplastic growths of glanders are characterized by a great tendency to disintegration, as well as to the formation of ulcers and abscesses, and are located in the mucous membrane of the organs of respiration (nose, larynx, bronchi), in the lungs, in the skin and subcutaneous cellular tissue, and less frequently in the other internal organs (liver, spleen, kidneys). A characteristic sign in the case of horses is the symmetrical manner in which the corresponding lymphatic vessels and glands are affected.

"THE TUBERCULAR FORM OF GLANDERS.—If the mode of development of the tubercles upon the mucous membrane of the nasal cavity is carefully studied at any one place, there will be observed at first miliary and submiliary elevations projecting from a more strongly injected background, and rendered visible by their turbid-white or yellowish-white opaque central portion. These points gradually enlarge, varying in size from a pinhead to a hempseed, and appear either isolated or united in larger groups. Upon careful observation there may often be seen a gray, transparent zone around this turbid white center, and beyond this a faintly marked red areola. Upon section these tubercles appear succulent, of a grayish-white color, while the center seems somewhat turbid, and frequently softened. In consequence of purulent degeneration of the superjacent membrane there ensues a slight erosion, and a small, isolated ulcer is rapidly formed. The small ulcers thus developed soon enlarge, presenting an eroded base and slightly everted edges. The confluence of adjacent ulcers results in the rapid formation of larger ones, upon the base and edges of which new tubercles arise, and these in turn by their rapid disintegration contribute to the enlargements of the ulcers. The surface of these glistening ulcers is for the most part covered with a yellow-white puriform secretion, frequently foul-looking, and tinged with blood. These ulcers, after they have existed for some time, are apt to attack the cartilage and bone, producing more or less destruction of these tissues. Alterations precisely similar are often also noticed within the cavities in the vicinity of the nose, and in the larynx and bronchi.

"Microscopically these specific miliary tubercles are in reality composed of round cellular elements, not to be distinguished in most cases from pus-corpuscles, and approximating in appearance, especially in chronic glanders, to the pale and somewhat larger granulation cells. * * *

"There results, in consequence of the softening of the tissue, and the granular and purulent degeneration of the newly formed cell elements, a central disintegration of the papules, while in other cases an ulcerative process is established. These ulcers, in case of chronic glanders, may heal, being transformed into stellated cicatrices; in most instances, however, there are produced in the neighborhood a continuous succession of new tubercles and ulcers.

"The specific tubercles of the lungs, in the early stage of their formation, bear a very close resemblance, when viewed with the naked eye, to miliary tubercles; they are, however, never found in so large numbers as in the miliary tuberculosis of man. They are composed, at first, of a cloudy-white or pale-yellow, punctiform, central portion, encircled by a grayish, translucent zone, which in turn is surrounded by a red, inflamed, and hyperaemic areola. Microscopically, these tubercles consist of a vascular,* delicate stroma, filled throughout with numerous round cells crowded to-

* Leisering demonstrated, by means of artificial injections, the existence of blood-vessels in the nodules of the lungs found in glanders. I myself saw in one nodule, which had become injected by natural means, large capillaries distended with blood, very similar to the newly formed capillaries in the granulations of wounds.

gether in clusters, and presenting the appearance of pus-corpuscles or ordinary granulation cells. In acute glanders they attain, at the most, the size of a pea; in the subacute, or chronic course of the disease, they become larger, varying in size from a walnut to an apple, and then assume often in part a fibroid structure. * * *

"In the cutaneous variety of glanders, or farcy, the specific nodules are located in the cutis, or else in the subcutaneous cellular tissue, and penetrate frequently into the muscles. They vary, moreover, in size, from a pea to a cherry, those of most recent formation being usually overlooked. They are not sharply defined from the surrounding tissue. Their minute structure is the same as that of the nodules of the nose and lungs. The process of central disintegration advances rapidly, the superficial openings giving rise to the so-called farcy ulcers, which have an eroded and generally foul appearance, discharging a creamy secretion of grayish-yellow color, frequently tinged with blood. With these phenomena there is generally combined an inflammation of the lymphatic vessels, which become distended by a yellow, purulent liquid, and are decidedly thickened, so as often to resemble a string of pearls ('farcy buds'). The corresponding lymphatic glands are similarly affected, becoming enlarged in cluster form, at some points taking on a form of hyperplastic swelling, and at others being studded with miliary tubercles. In the chronic variety the lymphatic glands become indurated, in the same manner as is observed in the infiltrated form. * * *

"In the infiltrated form of glanders, * * * patches of the mucous membrane of the nasal cavity, varying in size, become livid, swollen, and infiltrated with a gelatiniform serous liquid, the result of a diffused deposit of round cellular elements in the cavities and interstices of the connective tissue.

"As in ordinary diphtheritic infiltrations, there is produced, in consequence of the excessive deposit of cellular elements, gangrene of the tissue, recognizable by the excoriation of the superficial integument, and the formation of ulcers.

"In this manner are formed extensive checkered ulcers, the bases of which project above the level of the mucous membrane, the edges being slightly raised. These formations are often designated diphtheritic ulcers. Frequently solitary points only of the superficial surface are involved in the ulcerative disintegration now beginning. In the immediate vicinity are often found very small tubercles or small infiltrations varying in size from a hempseed to a bean; in other cases the tubercular growths may be altogether wanting. * * *

"So far as my personal observations extend, in one-third of all cases of glanders, both sides of the nasal cavity are involved; in one-third of the number the right side alone is affected, while in the same proportionate number the left side only is diseased. * * *

"In fifty-two cases of glanders, I observed twelve times, equal to twenty-three per cent, ulcers of the larynx and bronchi; and that this calculation is in reality an under-estimate of the frequency of the occurrence of this symptom, is shown by subsequent and more exact observations made by me (in Zürich), where in eleven cases, four only were free from these lesions of the bronchi and larynx."—*Ziemssen's Cyclopædia of The Practice of Medicine, vol. III., pages 333–341.*

"The minute anatomy of the morbid changes in glanders has been carefully examined by M. J. Renaut, and his observations have been communicated to the Academie des Sciences. He has found that the pulmonary 'tubercles' in the horse are composed of a number of granulations, commonly united in a racemose arrangement, and often grouped around a small bronchus. These recent granulations, composed of embryonal cells, usually fill each a pulmonary alveolus, and differ very little from those found in pyæmia in man. The neighboring alveoli of the lung are filled with blood —in some undergoing retrogressive changes, and in others more recently extravasated. In the older granulations the center had undergone fatty degeneration, and the cellular elements had become transformed into true pus, which ordinarily undergoes a caseous change. The cheesy nodule subsequently becomes softened, or undergoes slow atrophy. Meanwhile the lung becomes the seat of chronic inflammatory processes, points of sclerosis are found around the smaller bronchial tubes and in the tissue of the lung around the cheesy nodules. These changes, it will be seen, are by no means peculiar to glanders. The granulations of the mucous surfaces are closely analogous to those of the lung. The central growth is surrounded by an area of chronic inflammatory change in the mucous membrane, the lesion ultimately becoming stationary or undergoing caseation. The arterioles also become inflamed; their diameter is lessened, they cease to be permeable to blood, and ulceration is the common result of their obstruction. The author points out the curious analogies of this condition with many forms of blood-poisoning, which all have the common origin in septic material derived from without."—*London Lancet, 1875, page 575.*

The following description of the morbid process in glanders is quoted from Dr. Detmers' *Report on Glanders*, before mentioned, pages 271–3:—

"The vitality of the neoplastic products of glanders is limited, but differs considerably according to circumstances. The small, rapidly produced, and therefore numerous, cells, suspended in a dissolved intercellular tissue and exudations, are similar in every respect to matter-corpuscles; the same not only do not grow, but shrink and decay very soon. If the intercellular substance does not decay, but retains its original connective properties, the glanders-cells not only grow larger, but also a great deal older, than matter-corpuscles or tubercle-cells. This vitality will be the greater the larger the space or the greater the amount of the connective intercellular substance between the single cells. Their age, however, probably never exceeds a year or several months, notwithstanding that some glanders-nodules, tubercles, and tumors may exist, apparently unchanged, a much longer time, because the constituents of the latter, the glanders-cells, change. Old ones decay, and new ones take their place even if the whole tubercle or tumor remains essentially as it is. It is to be supposed that such a change is taking place, because every old glanders-tubercle or tumor contains always old and new cells in different stages of development.

"The retrogressive metamorphosis may be called a fatty necrobiosis. At first small granules (fat granules) make their appearance in the nuclei; the latter swell or increase in size; and grow darker; granules appear also within the cells, but outside of the nuclei, finally the envelopes or external membranes of the cells decay and fall to pieces, and a granulated detritus is left behind. * * * * *

"Frequently, however, that is, in all such tubercles and tumors in which the glanders-cells are numerous and separated only by very little intercellular tissue, the decay or retrogressive metamorphosis of the glanders-cells involves and causes a simultaneous decay and destruction of the intercellular substance, and of the tissue in which the morbid products are imbedded. The continuity is destroyed, and an abscess is formed. The decay usually, though not necessarily, begins in the center of the nidus of cells, and it seems that certain external influences are able to change or to accelerate the whole process. So, for instance, a general decay, or a formation of ulcers or abscesses, does not usually, take place in the mucous membrane of the maxillary cavities, but almost invariably, or, at any rate, a great deal earlier, in such parts of the nasal mucous membrane, which are exposed to the current of air passing through the nose at each breath. * * *

"The same specific agency, or the same virus, which is instrumental in communicating the disease from one animal to another, constitutes also the cause which spreads the morbid process within the organism of the affected animal. The efficiency does not seem to be dependent upon any particular shape or form of the morbid products, but to be inherent in the material, because not only the live glanders-cells, but also the dead or decayed ones, the granulated and cheesy detritus, and the watery transudations are infectious. The immediate changes produced by a local infection within the tissue, or the creeping of the morbid process from cell to cell, can be seen only under the microscope. If the glanders-process is not complicated, that is, if no other disease is existing, the spreading of the morbid process, or the progress of the local infection, is a slow one, but it is accelerated or becomes rapid if a complication sets in. The morbid process, however, spreads not only by means of a direct infection from cell to cell, but also by means of the lymphatics, which absorb infectious elements and deposit the same in the nearest lymphatic glands. That this is the case becomes evident if the animal is inoculated with glanders-virus. The lymphatics proceeding from the inoculation wound soon commence to swell like strands or cords, and undergo not seldom ulcerous decay. The lymphatic glands, too, commence to swell to solid and painful tumors which afterwards become harder and firmer, but less painful. A morbid production of connective tissue causes the firmness of the swelling, and usually renders such a diseased gland impervious to a further passage of the contents (lymph and infectious glanders elements) of the lymphatics, and prevents, therefore, a further spreading of the infection. If, however, a lymphatic gland, thus degenerated, becomes finally itself a seat of the neoplastic glanders-process, or of the production of glanders-cells, the lymphatics which pass from that gland to another one will also absorb infectious material, and cause thereby a further spreading of the infection and of the morbid process. * * * The spreading, however, will be a comparatively rapid one in all cases of glanders in which a complication with another destructive or acute disease, as an inflammatory process, has taken place. The morbid process is also apt to spread more rapidly through the lymphatics in common farcy, in which loose connective tissue constitutes the seat of the disease."—*Detmers on Glanders, pages 271–3.*

"Glanders-ulcers are always preceded by glanders-nodules or tubercles in the mucous membrane or skin, respectively, and are the product of a decay of the glanders-cells and a dissolution of the intercellular substance of those nodules or tubercles."—*Detmers on Glanders, page 279.*

ACUTE AND CHRONIC GLANDERS—SYMPTOMS, ETC.

Dr. Bollinger, the author of the article on Glanders, in Ziemssen's Cyclopædia, uses the terms "acute" and "chronic" to signify different methods of the invasion of the disease,—whether it comes on violently and abruptly, or insidiously. Using the terms in this sense, he says: "Although the chronic form often has an acute termination, the acute form is never transformed into the chronic." The following paragraphs may be found on pages 344–6 of vol. III. of the American edition, published at New York, in 1875:—

"In chronic glanders, the duration of which may be prolonged from a period of months to a year and longer, the disease cannot be diagnosticated, if the symptoms are confined exclusively to the invisible internal organs; and the case is equally obscure when the primary morbid deposits have been overlooked.

"With the above exceptions, however, when nodules and ulcers are present in the nasal cavity, the onset of the disease is characterized by the appearance of a nasal catarrh, which is frequently confined to one side. The discharge, at first clear, becomes gradually turbid, viscid, purulent, drying on the edges of the nostril, and is expelled in solid masses. Upon an examination of the nasal cavity by the eye—which if the local lesions are situated posteriorly, will be materially aided by the employment of a mirror—or, if the finger be introduced into the cavity, the characteristic tubercles and ulcers will be found, especially upon the sides of the *septum nasi*. The submaxillary glands upon the affected side will also be found to be enlarged, forming often an irregular mass the size of a walnut. These have a hard feel, are not painful to the touch, and are, as a rule, not movable with the integument, owing to the fact of their being adherent to the ramus of the jaw beneath. When the nasal ulcers have attained a certain size, the discharge becomes decidedly purulent, and often foul-looking, being tinged with blood. It produces then excoriation of the parts over which it flows. In the majority of cases little or no constitutional disturbance is excited. Upon longer duration and more complete development of the disease in the lungs, the animals fall away, the appetite diminishes, emaciation ensues, and with the signs of increasing cachexia death ultimately takes place, febrile symptoms having in many instances previously set in. Cicatrization of single ulcers, calcification and resolution of the nodules of the internal organs may take place, but these changes are not of frequent occurrence.

"When in the course of *chronic* glanders there are developed still other specific affections of the superficial integument or of the cutaneous connective tissue, or when *farcy is superadded* to glanders, there are formed upon different portions of the body, most frequently upon the extremities, head and neck, abscesses and nodules, of the size of a hazel-nut, which at the outset are hard and painful. While these abscesses are more or less rapidly breaking out, the *farcy sores* make their appearance, from which an exceedingly foul, sanguino-purulent discharge is poured out. These ulcers are for the most part deeply excavated, and have turbid-gray or grayish-red glistening bases, with elevated, usually ragged-looking edges. The surrounding cellular tissue is generally indurated and swollen; the corresponding lymphatic vessels swell, giving to the touch the idea of a cord ('farcy pipes'). Finally, the neighboring lymphatic glands are enlarged, hard, and at first somewhat painful.

"In *acute* glanders, whether in the form that is developed from the chronic, or in that which appears at the outset as such, there is to be seen, joined with marked febrile appearances, an excessive hyperæmic swelling of the mucous membrane of the nose, upon which, in the course of a few days, numerous tubercles, ulcers, and infiltrations may be made out. The nasal secretion is of a yellow tinge, viscid, and often sanguineous. The ulcers spread rapidly, even in the direction of the air-passages, and in the neighboring lymphatic glands and vessels the changes peculiar to lymphangitis and lymphadenitis may be found. There are frequently seen 'cords' in the scalp, which in some places may be œdematous. As the fever and prostration increase, the nodules and ulcers often appear in other portions of the body accompanied by œdematous swelling of the extremities, the lower portion of the abdomen, and the breast. The animals grow thin, and, after an illness varying in length from eight to twenty-one days, death ensues.

"When the *mucous membrane of the larynx and bronchi* is affected, the animals begin to cough and to manifest great sensibility in the laryngeal region.

"In cases where the *process of pneumonia is extensive*, and in *bronchitis*, a physical examination of the chest will indicate the nature of the internal lesions. As a rule, however, glanders of the lungs is not diagnosticated.*

"The varieties of the affection running a more subacute course present numerous intermediate features between acute and chronic glanders, on which account an exact classification is often impossible. With regard to the relation between acute and chronic glanders, it is proper to observe in this connection, that the latter variety is often found to produce, by inoculation, the former.

"Although the chronic form often has an acute termination, the acute form is never transformed into the chronic."—*Ziemssen's Cyclopædia, vol. III., pages 344–6.*

"The trephining of the sinuses of the jaws, as proposed by Haubner, may often render a correct diagnosis possible. In general, the inocculation of another horse, or of some other animal having a susceptibility to glanders (sheep, goat, rabbit), forms one of the surest aids to diagnosis."—*Ziemssen's Cyclopædia, vol. III., page 346.*

"*Chronic and acute glanders.*—Glanders, as a rule, is a chronic disease. The morbid changes develop slowly. Of the various forms in which the disease is able to make its appearance, pulmonal glanders, unless complicated with one of the other forms, or with other inflammatory or feverish diseases, is the most chronic, or takes the longest time to produce conspicuous symptoms and to become fatal. It takes frequently two or three years before the animal succumbs.* Nasal glanders is usually not quite so slow in its progress; still it also very often takes half a year or longer before the morbid process makes sufficient headway to produce plain, unmistakable symptoms, or before the chancrous ulcers, characteristic of glanders, make their appearance in the mucous membrane of the septum of the nose.† Farcy, or external glanders, is usually the least chronic (comes the soonest to a termination) of the various (uncombined) forms of glanders. Plain and unmistakable symptoms (veritable farcy-ulcers) make their appearance almost always within three months and frequently within a week or two after the infection has taken place. * * *

"Wherever glanders presents itself as an acute disease, either an uncommonly large quantity of the contagion has been introduced at once and brought in direct contact with the blood, or a complication of some sort has been effected."—*Detmers on Glanders, pages 264–7.*

THE SPECIFIC CAUSE OF GLANDERS.

Of the specific cause of glanders, Dr. Detmers says:—

"The contagion must be considered as the exclusive cause of glanders. When I lived in Dixon, Lee county, Illinois, from the fall of 1865, to September, 1868, I had an opportunity of observing numerous cases of glanders. A friend of mine, Dr. W. McKinney, dealer in horses and proprietor of a livery-stable, knew nearly every horse in the whole county, and taking special interest in those cases of glanders, assisted me in inquiring into the history of every horse affected. As a result, every case, without exception, was traced back to an infection by condemned United States army horses that had been sold to the farmers. The contagious principle is developed during the very first stages of the disease,† and even before plain symptoms have made their appearance."—*Detmers on Glanders, page 284.*

"Nobody has ever succeeded in producing glanders by merely exposing or subjecting a horse that has never been exposed to the influence of glanders-contagion to any or to all the injurious agencies and influences which have been mentioned as being accused as the causes of protopathic glanders."—*Same, page 281.*

"The German veterinarians, though differing at times considerably in opinion as to the nature of glanders, have never doubted its contagiousness; and German governments have always been very strict in taking the most effective measures against the spreading of that terrible enemy of the equine race, by requiring a prompt destruction of every horse reported by a veterinary surgeon as being affected with the disease. As a consequence, glanders has become a rare disease in Germany, and the annual losses are very insignificant."—*Detmers on Glanders, page 269.*

[* The two sentences to which this reference mark is attached may be compared with what is said in the first paragraph on page 312, relative to glanders in man; also with Dr. Detmers' account, on page 324-5 of this Report, of a horse which was supposed to have only the heaves, but which was finally proved to have glanders of the lungs.—H. B. B.]

[† The two sentences to which this reference mark is attached should be considered in connection with the statement of symptoms of glanders, in the first paragraph in the "Regulations" recommended on page 333 of this Report.—H. B. B.]

PERIOD OF INCUBATION OF GLANDERS IN HORSES.*

The period of incubation lasts usually, when the virus is artificially implanted, from three to five days, seldom longer. When the infection is received by means of a volatile infecting principle which excites local changes in the lungs and air-passages, the animal may long appear to be in perfect health, and the period of incubation appear to be weeks and even months.†

IS GLANDERS IN THE HORSE, CONSUMPTION IN MAN?

The study of glanders is of peculiar interest because of so many points of similarity between glanders and consumption, a disease the knowledge of which is of the greatest importance for the reason that consumption causes more deaths among men than does any other disease. One point of similarity is the similar tubercles which usually appear sooner or later in both diseases in the lungs, and which, in both diseases, tend to undergo a fatty or cheesy decay, but which are not, however, found in so great numbers in glanders in the horse, as in miliary tuberculosis in man. But a similar difference is found between farcy in the horse and in man. Aitken (vol. I., page 718) says that, in man, the farcy tubercles are larger and more numerous than in brutes. He also says that, in man, farcy is more common than glanders; but this may be only apparent if glanders in man is sometimes called consumption. Dr. Detmers, quoted in second paragraph on page 321, says: "As a rule, however, glanders of the lungs is not diagnosticated." If this is true of horses, examined by skillful veterinary surgeons who have in mind the liability of the occurrence of glanders, is it not likely to be true of man, even though examined by skillful physicians, because the attention of the medical profession has not been strongly called to this disease, especially not in that form.

The virulence and rapidity of development of glanders is increased by whatever increases inflammatory processes. Judging from the evidence derived from weekly reports of diseases in Michigan during the two years 1877 and 1878, the same is true of consumption. Evidence of the increase of consumption in connection with increased inflammations of the air-passages may be found in Diagrams 1, 2, and 3, on pages 292, 295, and 298 of the Annual Report of this Board for 1878, and with Diagrams 1, 2, and 4, on subsequent pages of this Report. The correspondence in these diagrams between the lines representing the course of consumption in 1877 and 1878 with the lines representing for the same years the course of influenza, bronchitis, and pneumonia, is quite noticeable. The coincident increased prevalence in the summer of 1878 of both bronchitis and consumption as compared with corresponding months of 1877 is worthy of especial attention.

"A few [of the German veterinarians] went even so far as to hold glanders to be identical with tuberculosis and scrofulosis. The tuberculosis doctrine originated in France and gained a good many adherents willing to look upon glanders as an equine tuberculosis."—*Detmers on Glanders, page 269.*

Inasmuch as the disease spreads by the propagation of glanders-cells within the tissue, and also by absorption of the virus, subsequently involving the lymphatic glands, and finally the general system, it is reasonable to suppose that animals and human beings may take in with their food the virus of chronic glanders, and as there does not seem to be any noticeable difference in the tubercles or the tuberculous matter in glanders and in consumption, there

* This may be compared with what is stated on page 311 of this Report.
† *Zeimssen's Cyclopædia*, vol. III., pages 343-4.

may be as much reason for supposing a disease which is propagated in the mesenteric glands, and which is characterized by tubercles, to be glanders as consumption. The same course of reasoning seems also to apply to tuberculous disease of the lungs.* Tubercular consumption is now known to be a communicable disease, though perhaps not always originating in that manner. It seems probable that what differences there are in the microscopic appearances in tuberculous matter in some forms of consumption in man, and in that of glanders in the horse, may be due to the differences in the tissue-cells, nuclei, and corpuscles in the two species of animals.

NATURE OF GLANDERS, MODES OF COMMUNICATION, AMONG HORSES.

The following quotations concerning the *nature* of glanders in *horses*, and *the modes of its communication* are from Ziemssen's Cyclopædia, vol. III., pages 320–2, 324–5:—

"*Glanders in horses is a specific infectious disease, the spontaneous origin of which has not been demonstrated.* Glanders and farcy are perfectly identical affections, both equally contagious, and differing only in their local manifestations. Farcy is nothing but the cutaneous eruption incident to glanders, and is often only a secondary manifestation, bearing about the same relation to the other phenomena that the erythema and specific papules do to syphilis. The distinction between glanders and farcy, recognized by most authors, has its origin in certain clinical requirements, and is not founded on any scientific mode of classification. We might, with as much propriety, designate the pulmonary phenomena of glanders as a separate affection.

"THE CONTAGIOUSNESS OF GLANDERS is at present almost universally admitted to be one of the most clearly demonstrated facts in the pathology of animal diseases. * * *

"Observations have thus far failed to determine the exact mode in which the virus of glanders penetrates the system. It is believed that the virus having become attached to the mucous membrane or the unabraded skin, sets up first at that point a local process, and thence forces its way subsequently into the remainder of the economy. It is a well-authenticated fact, that contagion is often produced by bringing in contact diseased and healthy animals, and, furthermore, by placing sound animals in stalls that have been previously occupied by those diseased.

"Reasoning upon *a priori* grounds, and from analogy with similar morbid poisons, it seems, indeed, improbable that the virus of glanders can be introduced into the system through the unabraded cutaneous and mucous tissues. * * * There are upon record, however, still further experiments, the results of which render it possible that the commonly received opinions upon this point are fallacious. If it were the fact that the virus of glanders is, as a rule, communicated by direct contact, we should naturally expect to find, on the one hand, a more frequent development of the cutaneous eruption, while, on the other hand, the mucous membrane in the immediate vicinity of the nostril would, with a certain degree of regularity, form the seat of tubercles and ulcers.

"We have been instructed, however, by clinical as well as by anatomical observations, that the cutaneous phenomena of glanders seldom make their appearance as a primary symptom, and, moreover, that the ulcers found in the mucous membrane of the nasal cavity are located, as a rule, in the upper portion of that cavity, extending thence downward toward the orifice. And if we assume the existence of an abrasion of the skin or mucous membrane to be essential to the introduction of the infecting principle into the economy, we are again met by the fact that the portion of the nasal cavity the least protected, and for that reason the most frequently exposed to injuries, is in reality the part that in exceptional cases only forms the seat of ulcers. It will be found, moreover, that the specific nodules and ulcers indicate no preference for those points that are shown by experience to be the most common seat of abrasions, cracks, and excoriations.

"In denying, then, the correctness of the prevalent belief, that the mucous tissues of the nose form the usual point of entrance of the infecting principle of glanders, we are almost of necessity forced by these reflections to admit the possibility of the *absorption of the virus together with the inspired air*, and in many instances, also with the food. Inasmuch as the lungs, the trachea, the larynx, and the upper portions of

* The first paragraph on page 317 of this Report, may be found of interest in this connection.

the nasal cavity are known to form the usual seat of the primary lesions, we are justified in concluding, that in a large proportion—possibly a majority—of all cases of glanders, a *volatile infecting virus* has found its way into the economy, together with the inhaled air, producing either a primary blood-poisoning with secondary specific phenomena in the parts above described, or primary nodules and ulcers in the lungs, followed subsequently by the symptoms of general poisoning. The mucous membrane of the nose may, indeed, be primarily infected, when that part happens to be the seat of a wound or erosion.—*Ziemssen's Cyclopædia, vol. III., pages 320–2.*

"It has also been determined that the virus of glanders, in the form of a *fixed infectious material*, may be found not only in the specific products of disease (the secretion from the nose, the solid and fluid contents of the nodules and ulcers), but also in the *blood*, and in the *secretions* and *excretions of the diseased body*, for example, the tears, saliva, sweat, urine, and milk.

"*The communication of the morbid poison by means of external media*, especially the harness, has been frequently observed. Some cases are also known in which the disease was communicated by the *act of coitus*, by *suckling*, by *hereditary transmission*, and finally, by the *absorption of the poison together with the food.* The nasal discharge, when taken into the stomach with the food, appears, however, to be less capable of producing infection than are the exhalations from the lungs.—(*Gerlach.*)

"All varieties of glanders, both acute and chronic, are in an equal degree infectious, although the infectious properties of the acute form are regarded by many as the stronger. If a horse affected with the chronic form of glanders be inoculated with pus taken from another horse suffering with the acute form the result is negative (St. Cyr); this serves to demonstrate the unity of the various forms of glanders, which in reality are only different manifestations of the same morbid process."—*Ziemssen's Cyclopædia, vol. III., pages 224–5.*

"Horses occupying a different stable from that of the affected animal, have been known to contract and die of the disease; and this, too, in the face of the fact that they were never brought in contact with each other. And yet with a full knowledge of the risk they run, some men are foolhardy enough to keep a glandered horse on their premises, prompted by the vain hope of being able to cure the patient of the disease."—*Boston Ploughman of March 2, 1878.*

The following paragraph concerning the communication of glanders is from *Youatt on the Horse;*—

"One horse has passed another when he was in the act of snorting, and has become glandered. Some fillies have received the infection from the matter blown by the wind across a lane, when a glandered horse in the opposite field has claimed acquaintance by snorting. It is almost impossible for an infected horse to remain long in a stable with others without irreparable mischief."

Of the communication of glanders by animals that show but slight symptoms of having the disease, Dr. Detmers says:—

"It happens sometimes that a horse is affected with glanders and communicates the disease to other healthy animals, but does not itself show any of the three principal symptoms characteristic of that disease; has no discharge from the nose, no swelled glands, and no ulcers in the nasal cavities. The late Professor Spinola, in his lectures on veterinary pathology at Berlin, related such a case to his students, which will serve as an illustration. It is substantially as follows: In a village near Berlin glanders broke out in a stable in which several horses were kept. A veterinary surgeon was called, who made an investigation and condemned every horse that showed any symptoms of the disease, and every animal condemned was immediately killed. The horses apparently not affected were kept for several weeks under police control, and from time to time inspected, but finally released. Among them was one old sorrel horse which had the heaves, and which had been brought into the stable a short time before the first case of glanders made its appearance. This sorrel horse soon after was sold to a man in another village, and came into a stable containing also quite a number of horses. In that stable, too, glanders broke out. A veterinary surgeon (another one) was called, and every horse showing symptoms of glanders was condemned and immediately destroyed. The old sorrel horse, however, which was known to have 'the heaves,' was again released after some length of time, together with those which had remained exempted, and was sold once more, this time to a man who kept over 30 horses (I have forgotten the exact number) in his

stable a few miles from the city. In this last stable glanders likewise made its appearance after some lapse of time, but in that case Professor Spinola was called. He, too, after a careful investigation, condemned every horse that showed any symptoms of glanders, and insisted upon condemning also the old sorrel horse, whose history was then unknown to him, notwithstanding that no symptoms of disease, except such as are usually attendants of heaves, could be observed. The owner hesitated to consent to the loss of a horse apparently not affected with glanders, but Spinola insisted upon the condemnation. The *post mortem* examination revealed that the old horse, which had the 'heaves,' was affected with pulmonal glanders in a very high degree; and Spinola, after learning the history of the old sorrel, was convinced that the latter had caused the outbreak of the disease in all three stables." —*Glanders, by H. J. Detmers, V. S., Chicago, Ill., in Special Report Department of Agriculture, on Diseases of Swine and Other Domestic Animals, 1879, pp. 260–261.*

NATURE OF THE GLANDERS-POISON.

Some investigators have found organic germs in the discharges of glandered horses and in other morbid products of the disease; others of high authority in regard to the disease have not been able to find such germs or have found only such forms as are of common occurrence in horses and which evidently have no connection with the disease. It may therefore still be considered an unsettled question whether the disease is produced and communicated by the action of minute living organisms on the membranes, tissues, or fluids of the affected animal, or whether the morbid processes of the disease are the result of virus of purely chemical action and independent of any living germ. In view, however, of the modes in which the disease is communicated, and of its persistence, theoretical considerations would seem to confirm the positive rather than the negative evidence in regard to living germs of the disease, though it is quite possible that these germs may be found to be the nuclei of the white blood corpuscles or of ordinary tissue cells, modified in some manner so as to make them and tissues formed near them break down more readily than they do in health. This seems a possible explanation of all that class of communicable diseases in which it is impossible to reproduce the unmodified germs except in living animals of allied species. The success in modifying that terrible disease in man—small-pox—by means of a virus derived from a species of animal so different from man as is the cow, is reason for hope that we may yet be able to so modify the germs or nuclei of all this class of diseases as to secure at will comparatively harmless instead of malignant and fatal diseases.

"The virus of glanders induces a catalytic action, as has been already demonstrated by Franck, similar in this respect to the infecting principle of syphilis and small-pox (Schönbein), resolving peroxide of hydrogen into water and oxygen.

"The poison of glanders is *fixed* and *volatile*. It adheres first of all to the specific products of the disease, the solid and fluid portions of the nodules and ulcers in every stage of their development, also to the blood, the secretions, and probably to all the tissues of the diseased animal that are permeated by the blood or other fluids. The *volatile* infecting principle differs essentially in its mode of action from that of various other infectious diseases, attaching itself for the most part to the exhalations and sweat of the diseased animals. According to the researches of Chauveau, with regard to the diffusibility of the virus of glanders, the *materies morbi* is contained not in the serum but exclusively in the organized bodies (pus and other corpuscular elements) suspended in the animal fluids. This hypothesis does not conflict with the volatile character of the poison, and will be found, moreover, to harmoize with the known phenomena of other morbid poisons. Upon the other hand, the chemical property of this virus is held (Virchow) to be the more important, being regarded as acrid and irritating.

"The virus of glanders manifests a pretty strong tenacity for life; for although in a dried condition its activity is frequently diminished (Viborg), it is often found to be effective after having remained for many months in stalls. If exposed in water to a temperature of 133° F. it loses its virulence (Viborg, Hofacker, Renault), and

the same effect is produced by a number of chemical agents (disinfectants), such as chlorine, carbolic acid, etc. Its activity is said to be destroyed by decomposition (Gerlach). While it loses its virulent property when taken into the digestive canal of man (Decroix), dogs, swine, and fowls (Renault), in the case of horses its activity is *impaired*, but not destroyed."—*Ziemssen's Cyclopædia, vol. III., pages 330–1.*

SPREAD OF GLANDERS BY ARMY HORSES.

In the report already referred to Dr. Detmers says (p. 281):—

"In the West, where I have lived and practiced during the last thirteen years, glanders, as I have been informed by reliable persons, used to be an almost unknown disease before the civil war, but has been spread by condemned army horses during and immediately after the war, and is now frequent and can be found everywhere."

Of the distribution of glanders by means of a war, Dr. Detmers says (same report, pp. 285–6):—

"Glanders always becomes a frequent disease after any great war. Such was the case in our own country after the great civil war, as I have mentioned before, and also in Germany and France, but especially in the latter country after the war of 1870–71. * * * The cause of this consists in the abundant opportunity of infection."

Of the importation of glanders from foreign countries, and the means necessary to prevent its spread in countries where many horses are imported, Dr. Detmers says:—

"As a general rule, which, however, suffers apparent exceptions, glanders is frequent in all those countries in which a great many horses are imported, and rare in all those countries in which more horses are raised than needed, or from which horses are exported. * * * That glanders is most frequent in those countries in which numerous horses are imported from other countries is an undeniable fact, except in regard to those commonwealths in which good veterinary schools provide a sufficient number of thoroughly educated veterinary surgeons, and in which stringent laws enforce the immediate destruction of every animal affected with glanders, prohibit veterinary quackery, and do not allow anybody to keep or treat a glandered animal unless he is a qualified veterinary surgeon, and gives sufficient bonds to pay possible damages."—*Detmers on Glanders, pages 281, 283.*

TREATMENT OF A GLANDERED ANIMAL.

Of the possibility of a cure of a case of glanders, Prof. Bollinger says:—

"The prognosis is always unfavorable. Although from a purely anatomical point of view the possibility of these ulcers being healed must be admitted, yet perfect recovery is indeed an extremely rare occurrence, inasmuch as in the vicinity of the healed portion new eruptions, as a rule, break out. The numerous reports of the healing of glanders and farcy have their origin, in a great number of cases, in errors of diagnosis, or else the recoveries were only apparent, the temporary arrest of the discharge from the nasal cavity being mistaken as an indication of recovery, whereas subsequently, genuine glanders and farcy reappeared.

"The nearest approach to a successful result is seen in the reparative action occurring in the primary tubercles and ulcers of the skin."—*Ziemssen's Cyclopædia, vol. III., page 347.*

"If some persons underrate the danger, it is because the disease may remain unrecognized in the infected horse for some months, or even years, and therefore, when it appears, it is attributed to other causes or to after inoculation. No glandered horse should be employed on any farm, nor should a glandered horse be permitted to work on any road, or even to pasture on any field. He should be destroyed.

"In a well settled case of glanders it is not worth while, except by way of experiment at a veterinary school to attempt any remedies. The chances of cure are too remote, and the danger of infection too great. * * * Worse than all, the man who attends on that horse is in danger."—*Youatt on the Horse, New York, 1857, page 113.*

In his paper on glanders, Dr. Detmers says, concerning the treatment of a glandered animal:—

"The only rational treatment of a horse or other animal affected with glanders consists in a proper and effective application, in the right place, of either half an ounce of lead or five inches of steel; and until such treatment is invariably adopted, or made compulsory, there will be no prospect whatever of freeing this country from this loathsome disease, dangerous even to man, in whom, if once infected, it is just as incurable as in horses."

Concerning the proper treatment of glandered horses, the writer in Johnson's Cyclopædia says:—

"Every glandered or farcy-budded horse should be killed at once, or reserved for treatment by competent veterinarians."

PREVENTION OF GLANDERS.

The only safeguards against glanders in horses appear to be, first, that the horses be kept from exposure to the disease, and second, as (in case of unknown exposure) the poison becomes less concentrated where there is an abundant supply of pure air, that the horses be kept in clean, well-ventilated stables. Prof. James Law, M. R. C. V. S., Professor of Veterinary Science in Cornell University, at Ithaca, N. Y., in a *Report on Glanders* made to the New York State Agricultural Society and published in the *Journal* of that Society for July, 1869 (vol. XIX., pp. 138–143) says, in speaking of the benefits of a FREE VENTILATION OF THE STABLE:—

"On this subject the cavalry statistics of different countries are most instructive. Rossignol informs us that, previous to 1836, the mortality of the French cavalry horses varied from 180 to 197 per 1,000 per annum. The enlargement of the stables and the freer introduction of fresh air reduced the yearly loss for the next ten years to 68 per 1,000. The ventilation is still, however, largely deficient, and the mortality is reported to have increased to 85 per 1,000, of which 50 per 1,000 is exclusively from glanders and farcy. In contrast with this, and as throwing light on the causes of this mortality, M. Moulin, chief army veterinarian, had under his charge, during the Italian war, 10,000 of these same horses, subject to all the additional risks and contingencies incident to active service, but kept in sheds, open to the external air, with very few cases of sickness, and only one case of glanders among the whole.

"The statements of Wilkinson, principal army veterinary surgeon in England, are equally conclusive. Formerly the mortality among the English cavalry horses was about equal to that of the French. Extensive improvements have been introduced into the stables in the direction of drying and ventilation, of which the following may be taken as a summary: All new stables are now built of one story only; the breadth is 33 feet; the height of the side walls to the spring, twelve feet; and of the roof eight and a half feet more. The breadth of each stall is five and a half feet, and there are only two rows of horses in each stable. Each horse is to have 100 superficial feet and 1,605 cubic feet; the ventilation is chiefly by the roof, where there is a louvre sixteen inches wide, carried from end to end of the building, and giving four square feet of ventilating outlet for each horse. A course of perforated bricks is carried round the eaves, equivalent to one square foot of inlet for each horse, and a perforated brick is introduced about six inches from the ground for every two stalls. There is a swing window for each stall, and spaces are left below the doors. Floor and surface drainage are equally ensured. In the old stables, with rooms overhead, ventilating shafts are carried up, perforated bricks introduced and more window space given. Most of the stables are still of this last variety, and the projected improvements are not so nearly completed as could be wished, yet the annual mortality only amounts to 20 per 1,000, and more than half of this is due to accidents and incurable diseases. What is more to the point is, that glanders and farcy have almost disappeared, and if a case occurs it is considered as evidence of neglect."—Prof. James Law, *Report on Glanders*, vol. XIX., page 141, Journal of the N. Y. State Agricultural Society.

DESTRUCTION OF GLANDERS-VIRUS.

"The discharges from the nose, glanders-matter, etc., lose their infectiousness if perfectly dried by being exposed to currents of air or to the rays of the sun: but

kept moist, for instance in a damp cellar, wrapped up in a moist rag, or adhering to the corners of the manger, to a damp wall or floor, or to the bedding or the manure, etc., the contagion seems to possess great vitality, and may remain effective for half a year or longer. Putrefaction does not destroy the contagious principle. Chlorine destroys the contagion, and is therefore a very efficient disinfectant, provided the chlorides used come in actual contact with the contagion. A brief exposure of the infectious substances, nasal discharges, glanders-matter, etc., to the influence of chlorine in a gaseous state, mixed with the atmosphere, is ineffective. * * * The best and surest destroyer of the glanders-contagion is carbolic acid. It may be used not only as a disinfectant or for the purpose of destroying the contagion clinging to the wood-work of the stable, etc., but also in incipient cases of farcy, and in cases in which an infection with glanders-matter has just taken place in a wound, for instance, as a local remedy. If applied to the glanders-ulcers on the septum, or to farcy-ulcers, a tendency to heal will make its appearance. As a disinfectant, a solution of carbolic acid in glycerine or alcohol and water (1:1 or 2:20) is perfectly strong enough to be effective. Old straw, hay, and bedding must be burned, and blankets, etc., are best disinfected by exposing the same for some time to a temperature of 212° F. or higher, either in an oven or in boiling hot water." —*Detmers on Glanders, pages 287–8.*

The necessity for thorough disinfection of stables where glandered animals have been kept is shown by the following statement:—

"Dr. Burgis says: 'A gentleman of fortune in the west of Ireland had had his stud infected with glanders; every particle of wood-work in the stables, including stalls, rack, manger, &c., was taken down and replaced with new materials; the plastering on the walls was completely removed, and the pavement ripped up; and all was replaced with entirely new work; but the first horses that were again put into those stables became infected, and they were ultimately razed to the ground. It would even appear that the contagious principle remains for a long period in any stable where glanders may happen.'"—*Cole's Diseases of Domestic Animals, Boston, 1847, page 120.*

Concerning the means and the possibility of exterminating the disease, Dr. Detmers says:—

"Glanders, as well as pleuro-pneumonia, Russian cattle-plague, and scab and mange, will cease to exist if a propagation by means of infection is made impossible. If, for instance, within the limits of the United States all animals affected with glanders were destroyed at once, and at the same time every place where glanders-contagion may be existing were thoroughly disinfected, and if any importation of glandered horses or of the contagion were successfully prohibited or prevented, glanders would at once become extinct, and would never make its appearance again within the limits of the United States, unless imported again from other countries. It is a disease that can be eradicated."—*Detmers on Glanders, page 283.*

If the disease were one from which animals only suffered and which thus only involved a loss of property, the owner of a glandered horse might be allowed to take the risk of losing his other horses by keeping this, provided always that he could be held to a strict responsibility for any damages that might thereby be caused to the property of others. But when it is considered that a glandered horse is a constant source of danger not only to its owner, through whose false ideas of economy it is kept alive, but to the lives of others innocent of his folly, there is abundant cause for the State to intervene and by the destruction of the horse remove the danger. This consideration, sufficient in itself, is enforced by the facts that the glandered horse is incurable and therefore almost worthless to its owner, and that it is a constant source of danger to other horses and thus itself a destroyer of value, often to its owner, as well as to others.

The necessity for the destruction of all glandered horses as a means of safety to man is well urged by Prof. Bollinger, as follows:—

"The inefficiency of all therapeutic agents in the treatment of glanders in the human subject renders *prophylactic measures* of great importance. The most efficacious of these measures consists in *stamping out, as far as possible, both glanders and farcy in horses*, a procedure to which, from considerations of economy, the attention

of State governments has for a long time been carefully directed. Thus, efficient sanitary regulations, carried out by police authorities, the destruction of glandered animals, as well as of animals suspected of being thus diseased, are the principal resources at our command."—*Ziemssen's Cyclopædia, vol. III., page 369.*

By the considerations which have been stated, certain duties seem to be plainly taught in regard to the management of a case of glanders or of suspected glanders in a horse, and these may be summarized in the following general recommendations.

GENERAL RECOMMENDATIONS FOR THE MANAGEMENT OF A CASE OF GLANDERS OR OF SUSPECTED GLANDERS.

1. Whenever there is reason to suspect that a horse or other animal has the glanders or has been exposed to the disease, he should be entirely separated from all other animals susceptible to the disease until from an examination or from repeated examinations by a competent veterinary surgeon it can be positively determined whether the horse or other animal has the disease, or, in case of a possible exposure, whether he has without contracting the disease passed the maximum period of incubation.

2. Notice of a case or of a suspected case of glanders should at once be given to the health officer of the township, city, or village in which the horse may be owned or kept, and all persons who might have anything to do with the suspected animal should be warned of the danger which they incur. As few persons as possible should go near the suspected animal, and they should be instructed and enjoined to take all possible precautions against contracting the disease or conveying it to others, they should avoid his breath, keep to the windward side, avoid receiving on an abraded skin any discharges, etc.

3. No glandered horse, or horse suspected to be infected with glanders, should be taken or allowed to be taken into any field, common, road, building, or other place frequented or liable to be frequented by other horses or by other animals susceptible to the disease.

4. When a horse is known to have the disease he should at once be killed, and the carcass should be buried deep in the earth.

5. The feed boxes, mangers, racks, etc., at which he may have eaten, and anything of the kind which he may have been in the habit of biting or rubbing should be burned. Any post or fence at which he may have stood should be destroyed. The harness, halter, wagon-pole, neck-yoke, combs, brushes, etc., which may have been used on or about the horse should either be burned or thoroughly disinfected. The safest way, and therefore the most economical way, is to destroy whatever by contact or association with the glandered horse may have become a means of communicating the disease.

6. The stable in which there has been a glandered horse should at once be destroyed or, if it be practicable, thoroughly disinfected, by burning therein at least two and one-half pounds of sulphur to every 1,000 cubic feet of air space therein.

7. Though some persons seem more susceptible to glanders than do others, and some animals than other animals of the same species, the greatest precaution should be taken to keep all from exposure; for in no case of exposure is there certainty of escape from the disease.

NEED OF LEGISLATION RELATIVE TO GLANDERS.

If sections 1699, 1700, 1703, and 1704 of the compiled laws of 1871, or other statutes, do not give the local board of health ample authority to kill a glandered horse, or other glandered animal, it would seem that a law should be passed authorizing the board, on the certificate of an expert that an animal has the glanders, to order it killed. There should also be a law by which the local board may restrain from all places where he might communicate the disease a horse or other animal suspected to be glandered, until his true condition can be known. Concerning this subject the following communication has been received from Dr. Henry F. Lyster, of Detroit, member of the State Board of Health:—

"I understand that there is no law in this State which prevents horses diseased with glanders or farcy from going at large or being used at service. Is this so? Also that there is no law ordering their destruction, etc., etc. If this is so, would it not be well to procure one? A friend of mine here killed three horses in one of his stables this year, for glanders, and came near losing all the horses in his stable, except for the timely discovery."

In the letter transmitting his report of a case of acute glanders in man, mentioned before, Dr. Duffield said:—

"The widow of this man sought to bring action against the horse-jockey who was the means of her husband's death; but there is no law which holds a man liable for the sale of a glandered horse, nor can a man be compelled to kill a glandered horse, nor be even compelled to keep him at home,—this is 'free Michigan.'"

In a report to the United States Department of Agriculture (page 145 of the Report of the U. S. Commissioner of Agriculture concerning *Disease Prevailing among Swine and other Domestic Animals*, made to the President in February, 1878), Prof. Law says concerning glanders:—

"Highly contagious and deadly not only to horses but to man, this affection is one that demands the most stringent measures for its extirpation. And yet we are doomed to see the victims of this disease freely exposed in public, kept in livery stables, watered at public drinking-troughs, worked on threshing-machines which travel from farm to farm, where the diseased animals feed from the mangers and drink from the buckets of the other horses, and palmed off on unsuspecting customers, who little know that they are purchasing a deadly poison, which may cut off their stock and themselves by a most loathsome and painful disease. And in this State of New York our only redress is by an action for damages against the vendor when the disease has wrought its dire work upon man or beast. This is truly a deep stain on our civilization. At frequent intervals over this region we find active centers of this dread disease, but are legally helpless to apply any efficient check."

Concerning the power of a local board of health under the present laws in Michigan to destroy a glandered horse, the following opinion has been expressed by Hon. LeRoy Parker, of Flint, committee of this Board on legislation in the interests of public health:—

"The question has sometimes arisen whether animals affected with a contagious disease may be summarily destroyed. The general rule seems to be that so long as the owner restrains the animals upon his own premises, no person has the right to kill them; but if they are suffered to go at large, or if they escape from the owner's custody, the owner of the premises upon which they escape, may kill them if necessary for the protection of his own animals.* In the case of horses affected with glanders, which is recognized as an incurable disease,† and one which may communi-

*Wood's Law of Nuisances, Sec. 837.
†Hanover's Law of Horses, p. 76.

cate all its loathsomeness and fatality to human beings, there is no question but what a board of health would be protected in destroying them wherever found, after due notice to the owners, if in their opinion it was necessary for the public health. This protection, however, would only be afforded in case the disease was actually the glanders."

The following quotation from the English law and suggestions concerning its adaptation to the conditions of this country are taken from a Report on Glanders by James Law, M. R. C. V. S., Professor of Veterinary Science in Cornell University, published in the Journal of the New York State Agricultural Society for July, 1869, vol. XIX, pages 139–140:—

"The English law runs thus (16 and 17 Vict. C. 42.):—

"'That any person bringing or attempting to bring, any horse, or other animal, into any market, fair, or other public place where animals are commonly exposed for sale, knowing such horse or other animal to be infected with or laboring under the disease called glanders; and any person turning out, keeping or depasturing any horse or other animal infected with or laboring under any such disease, *in or upon any forest, waste, moor, marsh, heath, common, waste-land, open field, roadside, or other undivided or uninclosed land, shall, on conviction of any such offense, forfeit and pay any sum not exceeding twenty pounds.*'

"For that portion which we have italicized something of the nature of the following might be substituted:—

"'In any uninclosed land or place, or in any enclosure in or from which it may come into contact with, or into close proximity to, other animals, shall, on conviction of any such offense, forfeit and pay any sum not exceeding one hundred and fifty dollars.'

"This would reach certain conditions, such as stables with stalls let to different persons, to which the English law does not directly apply.

"A clause should be added embodying some such provisions as the following:—

"'That any person having in his possession, or under his control, in any such public or exposed place, a horse, ass, or mule with a running from its nose and a hard knotted swelling on the inner side of his jaw blade, and who shall have failed to submit said animal to examination by an expert, whom the authorities shall name for that purpose, shall forfeit and pay any sum not exceeding ——. And said expert is hereby empowered to order the slaughter of such animal in case it shall be found to be suffering from glanders; or if its symptoms are equivocal, he shall retain it in safe keeping, in a place under his own control, and apart from all healthy animals, until the true nature of its malady shall have been ascertained.'"

The following regulations were adopted by the Rhode Island Board of Cattle Commissioners. The Legislature abolished this Board and conferred its powers on the State Board of Health. Substantially the same regulations were then adopted by the State Board of Health, April 22, 1878.

REGULATIONS OF THE RHODE ISLAND BOARD OF CATTLE COMMISSIONERS, ADOPTED MARCH 7, 1878.

"1. The owners of, or any person having the care of, any horse or other animal, knowing the same to have the disease called glanders, or farcy, shall keep such horse or other animal apart and separate from all other horses or animals.

"2. The owner, or any person having the care of any horse or other animal, knowing the same to have the disease called glanders or farcy, shall not lead, nor drive, nor permit such horse or other animal to go in or over any public street, road, lane, or highway in this State.

"3. Any veterinary surgeon or other person who shall have knowledge of any horse or other animal that has the disease called glanders or farcy, shall report the existence and location of such case of disease to some member of the Cattle Commission, within twenty-four hours after receiving knowledge of the same.

"The regulations passed June 9, 1877, are rescinded.

"The penalty for failure to comply with the above regulations, as fixed by section 8, chapter 76, of the General Statutes, is a fine not exceeding three hundred dollars, or imprisonment not exceeding one year.

"The first section of the same chapter provides that any person who shall knowingly expose a horse or other animal having any infectious or contagious disease to other horses or animals not infected with such disease, shall be fined not less than one hundred dollars, nor more than five hundred dollars.

"Section 7 provides that any person who shall sell *or offer to sell any horse or other domestic animal*, known to him to be infected with any contagious disease, shall be fined not more than one thousand dollars, or be imprisoned not exceeding two years, or both at the discretion of the court."

DUTIES OF LOCAL BOARDS OF HEALTH.

The duty of enforcing legal measures for the restriction and prevention of glanders, so far as the present laws of the State have any bearing on the subject, devolves in great part on the local board of health. The success of any measures adopted by the board depends on the promptness with which they are undertaken and the completeness with which they are carried out. It is desirable that no outbreak of glanders may find a board of health unprepared for prompt and summary action. The adoption of a set of regulations requiring all glandered animals to be restrained from contact with other animals and with man, and requiring immediate notice of a case of glanders to be given to the board of health, will serve as a warning of the danger to be apprehended from the disease, and in the event of the occurrence of a case of glanders within its jurisdiction will enable the health officer of the board without delay to proceed with some measures for its restriction. The following regulations are recommended for adoption by local boards of health throughout the State. They have received the approval of Hon. LeRoy Parker, of Flint, a member of the State Board of Health, and its committee on legislation in the interests of public health, to whom the author of this paper is indebted for valuable suggestions concerning that part of the paper which relates to existing or proposed legal measures. The blanks are, of course, to be filled with the word "township," "city," or "village," as the case may be.

REGULATIONS CONCERNING GLANDERS OR FARCY

ADOPTED BY THE BOARD OF HEALTH OF THE —— OF, ——, —— COUNTY, MICH.*

Glanders in horses or other animals is a disease dangerous to the public health, because it is often communicated to man, and in a majority of cases proves fatal. As a means of preventing its communication to men, the board of health of the —— of ——, county of ——, State of Michigan, hereby, on this the —— day of ——, A. D. 18—, adopts the following regulations for the restriction and prevention of glanders within its jurisdiction:—

1. The owner or owners of a horse or other animal, and the person or persons having the care of a horse or other animal, within this ——, knowing or having reason to believe the same to have the disease called glanders or farcy, shall keep such horse or other animal separate and apart from all other animals.

*See penalties for violation of rules made by local boards, sec. 1694, compiled laws of 1871.

A hard, knotted swelling on the inner side of the under jaw blade, together with a running from the nose of a horse, ass, or mule, affords "reason to believe" (until the question is otherwise decided by a competent veterinarian) that the animal has the disease called glanders; and this belief is strengthened if the animal has ulcers on the membrane lining the nose. Boils or buboes (on a horse, ass, or mule) which soon open and form ulcers with inflamed or corroded edges, together with cord-like swellings near the ulcers, or knotted swellings of the adjacent lymphatic glands, afford "reasons to believe" that the animal has the form of glanders called farcy.

2. No owner of a horse or other animal, and no person having the care of a horse or other animal, knowing or having reason to believe the same to have the disease called glanders or farcy, shall lead, or drive such animal, or permit it to go, in or over any public common, street, road, highway, lane, or alley in this ——; or water such horse or other animal, or suffer it to drink, at any public watering trough, pail, or spring; or suffer such diseased horse or animal to be kept in any enclosure in or from which it may come into contact with or close proximity to any other animal not infected with such disease.

3. Every owner of a horse or other animal which he knows or has reason to believe has the disease called glanders or farcy, and every person having care of such an animal, within this ——, shall at once give notice of the disease and of the location of the diseased animal to the health officer of this ——, within twenty-four hours after receiving knowledge of the same.

4. Any veterinary surgeon or person who acts as such, who shall have knowledge of any horse or other animal that has the disease called glanders or farcy, within the jurisdiction of this board, shall report the existence and location of such diseased animal to the health officer of this ——, within twenty-four hours after receiving knowledge of the same.

5. No person shall knowingly expose, directly or indirectly, a horse or other animal having the disease called glanders or farcy to any other horse or animal not having such disease.

6. Whoever violates the provisions of the foregoing regulations, shall be liable to a penalty not exceeding one hundred dollars.*

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Signed ----------, ----------,

Clerk. *President.*

Members of the Board of Health of the ---------- *of* ----------

*In accordance with section 1694, compiled laws of 1871.

ACTIVE MEASURES BY LOCAL BOARDS OF HEALTH.

Besides publishing these general regulations for the restriction of glanders, in accordance with section 1698 of the compiled laws of 1871, it seems desirable that the board of health should by resolution instruct its health officer that on receipt of information that there is within the jurisdiction of the board a glandered animal he shall immediately give notice thereof to the the members of the board, and forthwith "give public notice" of the infected place or places, in accordance with the provisions of section 1732, compiled laws of 1871. He should also be instructed to verify the information, and if there be an actual case of glanders or farcy, to carry out some such general measures for the restriction and prevention of the disease as are given on page 329 of this Report, except the destruction of the horse; this would seem to require that the board shall be convinced that the animal really has the glanders, or is dangerous to the public health, and that the board shall give the proper notice and order that the animal be destroyed.

Having received reliable information of a glandered animal within its jurisdiction, the board of health should at once set to work to secure the destruction of the dangerous animal, by legal notice and order of the board, under sections 1699, 1700, 1701, 1703, and 1704 of the compiled laws of 1871. While no glandered animal should be permitted to live to endanger the lives of men, the right of a board of health to destroy an animal is derived from the fact that its existence is a danger to the health or lives of men; therefore it is important that the board should not destroy, as glandered, an animal which is free from glanders or farcy. If, in coming to a decision, the members of the board make use of the best available veterinary skill, they should be able to decide correctly and to defend their action in court if called on so to do.

The author of this paper makes no claim for any addition of new facts to existing knowledge on the subject of glanders, though he has ventured to suggest a few explanations of facts hitherto known; but he hopes that from this grouping of well-established facts and evident considerations of public policy, clearer ideas of the disease may prevail among the people, and improved methods may be adopted for the protection of the people of this State from this loathsome and dangerous disease, by means of which methods such horrible deaths as are herein recorded as having occurred in this State may be prevented.

HENRY B. BAKER,
Committee.

THE

PRINCIPAL METEOROLOGICAL CONDITIONS IN MICHIGAN

DURING THE YEAR 1878:

A Compilation Based, in Great Part, upon Reports by the

METEOROLOGICAL OBSERVERS

FOR THE

STATE BOARD OF HEALTH:

COMPILED AND PREPARED IN THE OFFICE OF THE SECRETARY OF THE BOARD,
LANSING, MICHIGAN.

THE PRINCIPAL METEOROLOGICAL CONDITIONS IN MICHIGAN DURING THE YEAR 1878.

In the Report of this Board for 1878 was published a study of some of the principal meteorological conditions in Michigan in the calendar year 1877. That study is here continued for the year 1878. The reports here compiled were received from the observers a compilation of whose reports was published for the year 1877, and from two others, Drs. A. W. Nicholson, of Otisville, and J. S. Reeves, of Niles. Dr. H. T. Calkins, however, removed in January, 1878, from Fife Lake to Petoskey, and his observations were interrupted for that month. At the Asylum for the Insane at Kalamazoo, Dr. E. H. Van Deusen was succeeded, in March, 1878, as medical superintendent, by Dr. Geo. C. Palmer. The observations continue to be made, however, by Mr. A. M. Munn. The names of observers and their places of observation are stated in Exhibit 9. Observations not for the entire year or nearly the whole year have not been used in this article. Some new meteorological stations were established during the year 1878, and several of the observers were supplied with additional instruments. The methods of recording and of stating the meteorological conditions were fully stated in the Report for 1878, and need not here be repeated.

EXHIBIT 9.—*Names of Observers whose Reports are summarized in the following Meteorological Tables and Diagrams, their Places of Observation, and the Counties and Geographical Divisions of the State, in which these Places are situated.*

NAME OF OBSERVER.	PLACE OF OBSERVATION.	COUNTY.	GEOGRAPHICAL DIVISION OF THE STATE.*
H. T. Calkins, M. D.	Petoskey	Emmet	Northern.
Lee S. Cobb	Nirvana	Lake	Western.
Prof. R. C. Kedzie, M. D.	State Agricultural College, near Lansing.	Ingham	Central.
A. W. Nicholson, M. D.	Otisville	Genesee	Central.
John S. Caulkins, M. D.	Thornville	Lapeer	Bay and Eastern.
John Bell, M. D.	Benton Harbor	Berrien	South Western.
James S. Reeves, M. D.	Niles	Berrien	South-Western.
J. H. Kellogg, M. D.	Battle Creek	Calhoun	Southern-Central.
Lyman P. Alden, Supt. State Public School.	Coldwater	Branch	Southern-Central.
E. H. Van Deusen,† M. D. Geo. C. Palmer,‡ M. D.	State Asylum for Insane, Kalamazoo.	Kalamazoo	Southern-Central.
Edwin Stewart, M. D.	Mendon	St. Joseph	Southern-Central.
Harrison Peters, M. D.	Tecumseh	Lenawee	Southern-Central.
Prof. L. Mc Louth	State Normal School, Ypsilanti.	Washtenaw	Southern-Central.
Theo. V. Van Heusen, Sergt. U. S. Signal Service.	Detroit	Wayne	South-Eastern.
F. W. Higgins, Supt. Woodmere Cemetery.	Woodmere Cemetery, near Detroit.	Wayne	South-Eastern.

* The counties included in each Division are stated in Exhibit 1, page 153.
† For first three months of the year. ‡ For last nine months of the year.

EXHIBIT 10.—*Statements of Meteorological Conditions in the Year and in each Month of the Year 1878, Compared with Annual and Monthly Averages for 1877 and for several Stated Periods of Years,—from Observations at the State Agricultural College, near Lansing, Michigan.*

METEOROLOGICAL CONDITIONS.	1878 Compared with Averages for Previous Years. No. of Years Averaged, ending with 1877.	1878 Compared with Averages for Previous Years. More (+), or Less (-), in 1878 than the Average.	In 1878 More (+), or Less (-) than in 1877.	METEOROLOGICAL CONDITIONS.	1878 Compared with Averages for Previous Years. No. of Years, Averaged ending with 1877.	1878 Compared with Averages for Previous Years. More (+), or Less (-), in 1878 than the Average.	In 1878 More (+), or Less (-), than in 1877.
Year 1878.				**Year 1878.—*Continued.***			
Temperature	14	+1°.76 F.	+0°.87	Rainfall	14	+1.66 in.	-5.41 in.
Range of Temp.	5	-11°*	-2°	Day Ozone	6	-0.30‡	-0.16‡
Av. Daily Range of Temp.	8	-2°.24†	-2°.50†	Night Ozone	6	-0.82‡	+0.10‡
Cloudiness	14	-1 per ct.	+5 per ct.	Atmospheric Pressure	14	+.041 in.	-.013 in.
January.				**February.**			
Temperature	14	+7°.18 F.	+10°.97	Temperature	14	+3°.97 F.	-4°.26
Monthly Range of Temp.	5	-9°*	-9°	Monthly Range of Temp.	5	+4°*	+16°
Av. Daily Range of Temp.	8	-2°.78†	-3°.52†	Av. Daily Range of Temp.	8	-1.44†	-0°.31†
Cloudiness	14	+2 per ct.	+12 per ct.	Cloudiness	14	-8 per ct.	+15 per ct.
Rainfall	14	-0.68 in.	-0.21 in.	Rainfall	14	+1.12 in.	+2.74 in.
Day Ozone	6	-1.32‡	-1.13‡	Day Ozone	6	+0.03‡	+0.46‡
Night Ozone	6	-1.52‡	-0.55‡	Night Ozone	6	-0.67‡	+1.19‡
Atmospheric Pressure	14	+.075 in.	+.042 in.	Atmospheric Pressure	14	+.014 in.	-.098 in.
March.				**April.**			
Temperature	14	+10°.08 F.	+16°.72	Temperature	14	+4°.90 F.	+4°.41
Monthly Range of Temp.	5	-14°*	-11°	Monthly Range of Temp.	5	-19°*	-17°
Av. Daily Range of Temp.	8	-3°.23†	-3°.13†	Av. Daily Range of Temp.	8	-2.67†	-2°.06†
Cloudiness	14	+8 per ct.	+10 per ct.	Cloudiness	14	+1 per ct.	+9 per ct.
Rainfall	14	+0.31 in.	-2.46 in.	Rainfall	14	+1.36 in.	-0.38 in.
Day Ozone	6	-0.18‡	-0.61‡	Day Ozone	6	+0.50‡	+0.67‡
Night Ozone	6	-1.19‡	-1.12‡	Night Ozone	6	-0.46‡	+0.26‡
Atmospheric Pressure	14	+.051 in.	+.046 in.	Atmospheric Pressure	14	-.093 in.	-.099 in.
May.				**June.**			
Temperature	14	-3°.78 F.	-3°.71	Temperature	14	-4°.65 F.	-2°.21
Monthly Range of Temp.	5	-16°*	-16°	Monthly Range of Temp.	5	+1°*	+6°
Av. Daily Range of Temp.	8	-3°.75†	-3°.44†	Av. Daily Range of Temp.	8	-1°.53†	-1°.57†
Cloudiness	14	+2 per ct.	+20 per ct.	Cloudiness	14	-5 per ct.	-6 per ct.
Rainfall	14	+0.63 in.	+1.21 in.	Rainfall	14	-0.78 in.	-0.38 in.
Day Ozone	6	+0.29‡	+0.68‡	Day Ozone	6	+0.22‡	0.00‡
Night Ozone	6	-0.14‡	+1.16‡	Night Ozone	6	+0.16‡	+0.10‡
Atmospheric Pressure	14	+.046 in.	-.043 in.	Atmospheric Pressure	14	+.035 in.	+.010 in.

* By registering thermometers. † By observations at 7 A. M., 2 P. M., and 9 P. M., daily.

‡ Degrees, by scale of 10 degrees of coloration of Schönbein's test-paper, exposed from 7 A. M. to 2 P. M., for the day observation; and from 9 P. M. to 7 A. M., for the night observation.

EXHIBIT 10.—CONTINUED.—*Meteorological Conditions in Months of the Year 1878, Compared with Averages for Corresponding Months in Preceding Years.*

METEOROLOGICAL CONDITIONS.	1878 COMPARED WITH AVERAGES FOR PREVIOUS YEARS. No. of Years Averaged, ending with 1877.	More (+), or Less (-), in 1878 than the Average.	In 1878 More (+), or Less (-), than in 1877.	METEOROLOGICAL CONDITIONS.	1878 COMPARED WITH AVERAGES FOR PREVIOUS YEARS. No. of Years Averaged, ending with 1877.	More (+), or Less (-), in 1878 than the Average.	In 1878 More (+), or Less (-), than in 1877.
JULY.				AUGUST.			
Temperature	14	+1°.09 F.	+1°.65	Temperature	14	+1°.10 F.	+1°.67
Monthly Range of Temp.	5	+1°.00*	+3°	Monthly Range of Temp.	5	-5°*	+1°
Av. Daily Range of Temp.	8	-3°.02†	-3°.78†	Av. Daily Range of Temp.	8	-0°.18†	+0°.26†
Cloudiness	14	-11 per ct.	-7 per ct.	Cloudiness	14	-9 per ct.	-7 per ct.
Rainfall	14	-0.39 in.	+0.71 in.	Rainfall	14	-0.85 in.	-4.72 in.
Day Ozone	6	-0.34‡	-0.61‡	Day Ozone	6	-0.38‡	-1.10‡
Night Ozone	6	-0.50‡	-0.03‡	Night Ozone	6	-0.27‡	+0.49‡
Atmospheric Pressure	14	+.071 in.	+.023 in.	Atmospheric Pressure	14	-.031 in.	-.036 in.
SEPTEMBER.				OCTOBER.			
Temperature	14	+3°.01 F.	+1°.87	Temperature	14	+0°.94 F.	-2°.40
Monthly Range of Temp.	5	+4°*	+14°	Monthly Range of Temp.	5	+1°*	0
Av. Daily Range of Temp.	8	-2°.28†	-1°.54†	Av. Daily Range of Temp.	8	-1°.12†	+1°.96†
Cloudiness	14	-5 per ct.	+9 per ct.	Cloudiness	14	-5 per ct.	-12 per ct.
Rainfall	14	+0.47 in.	+2.05 in.	Rainfall	14	-0.34 in.	-3.70 in.
Day Ozone	6	-0.51‡	-0.70‡	Day Ozone	6	-0.91‡	-0.49‡
Night Ozone	6	-0.78‡	+0.07‡	Night Ozone	6	-1.99‡	-1.22‡
Atmospheric Pressure	14	+.081 in.	+.036 in.	Atmospheric Pressure	14	+.035 in.	+.003 in.
NOVEMBER.				DECEMBER.			
Temperature	14	+1°.16 F.	+1°.09	Temperature	14	-°3.97 F.	-15°.28
Monthly Range of Temp.	5	-19°*	-14°	Monthly Range of Temp.	5	-19°*	-7°
Av. Daily Range of Temp.	8	+1°.68†	+0°.10†	Av. Daily Range of Temp.	8	-2.97†	-0°.87†
Cloudiness	14	0 per ct.	-5 per ct.	Cloudiness	14	+14 per ct.	+17 per ct.
Rainfall	14	+0.30 in.	-1.51 in.	Rainfall	14	+0.47 in.	+1.24 in.
Day Ozone	6	-0.96‡	-0.43‡	Day Ozone	6	-0.04‡	+1.38‡
Night Ozone	6	-1.83‡	-0.59‡	Night Ozone	6	-0.56‡	+1.37‡
Atmospheric Pressure	14	+.063 in.	-.018 in.	Atmospheric Pressure	14	+.103 in.	-.033 in.

* By registering thermometers. † By observations at 7 A. M., 2 P. M. and 9 P. M., daily.
‡ Degrees, by scale of 10 degrees of coloration of Schönbein's test-paper, exposed from 7 A. M. to 2 P. M., for the day observation; and from 9 P. M. to 7 A. M., for the night observation.

METEOROLOGICAL CHARACTERISTICS OF THE YEAR 1878.

In Exhibit 10, pages 338–9, a comparison is made, for the year and by months, of meteorological conditions at the State Agricultural College, 3½ miles east from Lansing, in 1878 and 1877, and of conditions in 1878 with averages for several previous years. Such comparisons are also made in several of the following exhibits, which also state the conditions for 1878 at the same place of observation, and the averages for the same periods of previous years. Observations at the college were chosen for these comparisons because they extend further back than those in possession of the Board for any of the other

stations, and because, being taken near the center of the settled part of the State they may be assumed as well as any to be representative of the conditions to which a large majority of the people of the State are subject.

The high temperature in January, February, March, April, and September, the low temperature in May, June, and December, and the small range of temperature for the year (11° less than the average for the preceding 5 years), may be mentioned among the peculiarities of the year. The highest temperature recorded at the Agricultural College in 1878 was 3° higher than the average highest for the preceding 5 years, while the lowest was 14° higher than the average lowest for the same time.

DIAGRAMS OF METEOROLOGICAL CONDITIONS IN 1878.

As for 1877, so also for 1878 diagrams have been prepared graphically representing the changes in the several meteorological conditions tabulated, from month to month throughout the year. These diagrams, it has been the aim to make as nearly self-explanatory as possible. The intersection of the irregular line representing conditions at any locality with the perpendicular line for any month marks the degree or the amount intended to be indicated for that month at that locality. This degree or amount may readily be determined by following the nearest horizontal line to the number stated in the left-hand margin of the diagram, and, if necessary, adding or subtracting according to the distance of the said point of intersection above or below that horizontal line. In the tables these conditions are definitely stated, and to the tables reference may easily be made from any diagram by considering the subject of the diagram. For convenience of reference, the diagrams are in most cases printed opposite the tables from which they are made, and which they are designed to illustrate. Diagrams X., XI., and XII., relating to the direction of the wind, are somewhat differently constructed and require a separate explanation.

DIAGRAMS X., XI., AND XII., RELATIVE TO THE DIRECTION OF THE WIND.

The figures or separate groups of lines in these diagrams are designed to indicate the number and the proportion of regular observations at which the wind was blowing from each of the eight principal points of the compass at the places and for the periods of time stated in the margin. The points of compass are represented as is usually done on maps, namely,—north, by the top of the page; south, by the bottom; east, by the right-hand; and west, by the left-hand side. Each figure consists of lines drawn to a common center from some or all of the following directions on the page, and indicating that at the time of observation the wind blew from points of the compass as follows: Lines toward the common center from the top of the page indicate that the wind blew from the north; from the right-hand side, that the wind was from the east; from the bottom of the page, that it was from the south; from the left-hand side, that it was from the west; from the upper left-hand corner, that it was from the north-west; from the upper right-hand corner, that it was from the north-east; from the lower right-hand corner, that it was from the south-east; from the lower left-hand corner, that it was from the south-west. The length of each line denotes the number of regular observations at which the wind blew from the given direction, .01 of an inch being the unit, or the length of the line for one observation. The circles indicate calms, the number of regular observations at which there was no wind being denoted by the length of the radius of the circle drawn about the point of convergence of the lines for a given place or period of time, the length for one observation being, as before, .01 of an inch.

TEMPERATURE.

The average daily temperature in 1878 at 14 localities was higher by 0.57 degrees than the average at 12 localities in 1877, most of the localities being the same in each year. Exhibit 11 states by months and for the year the average temperature for 12 localities in 1877, and for 14 localities in 1878, and also the amount by which the temperature was higher or lower in 1878 than in 1877. The most marked differences between the two years occurred in January, March, and December, the average for March being 15 degrees higher, and that for December being 13 degrees lower, in 1878 than in 1877. Though the average for February was 2 degrees lower in 1878 than in 1877, for both years this was a very warm month. It will be remembered that in 1877 February and December were unusually warm, and March was unusually cold, while January was more than 3 degrees colder than the average January temperature for the 14 years ending with and including 1877.

EXHIBIT 11.—*Comparison, by Year and Months, of the Average Daily Temperature at 14 Localities (in Michigan) in 1878 with the Average in 1877 at 12 Localities.**

YEARS, ETC.	AVERAGE TEMPERATURE,—DEGREES F.												
	Annual Av.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 12 Localities in 1877	48 67	19.18	32.27	25.92	46.71	58.24	67.48	72.80	70.52	63.80	52.78	37.57	36.73
Av. for 14 Localities in 1878	49.24	27.17	29.75	41.46	52.27	54.73	65.18	74.22	70.92	63 99	50.13	38.34	22.74
In 1878 Higher than in 1877	0.57	7.99	------	15.54	5.56	------	------	1.42	0.40	0.19	------	0.77	------
In 1878 Lower than in 1877	-------	------	2.52	------	------	3.51	2.30	------	------	------	2.65	------	13.99

* Eleven of the stations were the same for both years, viz., Nirvana, Thornville, Benton Harbor, Battle Creek, Coldwater, Kalamazoo, Mendon, Tecumseh, Ypsilanti, Woodmere Cemetery (near Detroit), and Detroit; one, the Agricultural College, was included in the average for 1877 but not in that for 1878; and three, Petoskey, Ottsville, and Niles, were included in the average for 1878 but not in that for 1877.

EXHIBIT 12.—*Comparisons of the Average Temperature (Degrees F.) in the Year, and in each Month of the Year 1878, with the Annual and Monthly Averages for the Year 1877, and for the Fourteen Years 1864–77.—Compiled in the Office of the State Board of Health, from Records of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily, made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan, and near the Center of the thickly-settled part of the State.*

YEARS, ETC.	AVERAGE TEMPERATURE,—DEGREES F.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	J'ne.	J'ly.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 14 Years, 1864–1877	46 53	21.93	24.10	30.82	45.65	58.35	68.73	71.95	69.05	60.14	47.39	35.13	25.26
1877	47.42	18.14	32.33	24.18	46 14	58.28	66.29	71.39	68.48	61.28	50.73	35.20	36.57
1878	48.29	29.11	28.07	40.90	50.55	54.57	64.08	73.04	70 15	63.15	48.33	36.29	21.29
In 1878 Higher than Av. for 14 Years 1864–77	1.76	7.18	3.97	10.08	4.90	-----	-----	1.09	1.10	3.01	0.94	1.16	-----
In 1878 Lower than Av. for 14 Years 1864–77	--- ----	-----	-----	--	-----	3.78	4.65	-----	-----	-----	-----	-----	3.97
In 1878 Higher than in 1877	0.87	10.97		16.72	4.41	-----	-----	1.65	1.67	1.87	-----	1.09	-----
In 1878 Lower than in 1877	--------	-----	4.26	--	-----	3.71	2.21	-----	- ---	-----	2.40	-----	15.28

EXHIBIT 13.—*Average Temperature for the 14 Years, 1864–77, Variations in the Average Temperature for each of the 14 Years, 1864–77, and for 1878, from the Average Temperature for this Period, and in the Average Temperature of every Month of the same Years from the Average Temperature for the Corresponding Months of the Period; also, Average and Extreme Annual and Monthly Variations (in the Average Temperature) for the same Period.—Observations made at 7 A. M., 2 P. M., and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

YEARS, ETC.	Degrees Fahr. Warmer (+), or Colder (-), than The Average Temperature for The 14 Years, 1864–77.												
	Annual.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. Temp., 14 Years, 1864–77*	46.53	21.93	24.10	30.82	45.65	58.35	68.73	71.95	69.05	60.14	47.39	33.13	25.28
1864	+.79	+.33	+3.22	+.92	+.21	+1.84	-1.11	+2.57	+1.67	-.52	-1.65	+2.75	-.99
1865	+1.59	-.83	+3.49	+9.14	+1.75	-.70	+2.03	-6.35	-3.21	+7.52	-.89	+3.50	+2.46
1866	-.93	-.77	-1.39	-1.22	+3.29	-3.31	-2.13	-.23	-6.45	-4.34	+2.11	+2.81	+.27
1867	+.38	-4.32	+6.79	-1.10	+2.55	-7.24	+2.88	-.35	+.73	-3.54	+3.21	+5.31	+.05
1868	-.19	-2.93	-5.38	+6.98	-1.97	+.73	-.27	+5.24	+1.28	-1.37	-2.20	+1.64	-4.10
1869	-.26	+7.45	+2.56	-3.22	+.05	-2.33	-4.28	-1.60	+1.53	+3.31	-6.59	-3.08	+2.90
1870	+2.58	+3.44	+.15	-.54	+4.74	+5.97	+2.14	+2.45	+1.06	+3.52	+5.66	+3.27	-.46
1871	+1.40	+2.82	+1.55	+7.36	+4.48	+3.04	-.52	-1.35	+2.14	-2.04	+6.52	-3.18	-4.14
1872	-.99	-.34	-2.76	-6.07	+1.74	+.13	+3.09	+2.96	+2.17	+1.89	+.05	-5.33	-9.52
1873	-1.99	-6.06	-5.00	-2.52	-2.48	-1.37	+1.87	-1.13	+.44	-2.76	+2.71	-6.64	+4.28
1874	+.52	+5.77	+1.41	+1.48	-3.78	+1.23	+1.88	+.07	+.34	+2.71	+1.71	-.13	+1.70
1875	-3.47	-9.06	-16.11	-4.62	-4.54	+2.47	-2.16	-2.28	-3.57	-1.64	-4.46	-2.17	+6.32
1876	-.36	+8.29	+3.28	-.27	-1.49	-.40	-.59	+.53	+2.50	-3.84	-3.65	+1.20	-10.03
1877*	+.89	-3.86	+8.21	-6.31	+.51	-.10	-2.80	-.52	-.59	+1.14	+3.44	+.11	+1.31
1878	+1.76	+7.18	+3.97	+10.08	+4.90	-3.78	-4.65	+1.09	+1.10	+3.01	+.94	+1.16	-3.97
For 14 Yrs., '64–77: Av. Variation...†	1.17	4.02	4.38	3.70	2.76	2.20	1.98	1.97	1.98	2.87	3.16	2.94	3.47
Greatest Variations	-3.47	-9.06	-16.11	-6.31	-3.78	-7.24	-4.28	-6.35	-6.45	-4.34	-6.59	-6.64	-10.03
	+2.58	+8.29	+8.21	+9.14	+4.74	+5.97	+3.09	+5.24	+2.50	+7.52	+6.52	+5.31	+6.32
Range of Variations...†	6.05	17.35	24.32	15.45	13.52	13.21	7.37	11.59	8.95	11.86	13.11	11.95	16.35
Least Variations	+.38	+.33	+.15	+.92	+.05	+.13	+1.87	+.07	+.34	+1.14	+.05	+.11	+.05
	-.19	-.34	-1.39	-.27	-1.49	-.10	-.27	-.23	-.59	-.52	-.89	-.13	-.46
Times less than 1°.0	9	4	1	3	3	5	3	5	4	1	2	2	4
Times less than 1°.5	10	4	3	6	4	7	4	7	6	3	2	3	5
Times less than 2°.0	12	4	4	6	7	8	6	8	8	5	4	4	6
Times less than 2°.5	12	4	4	6	8	10	10	10	10	6	6	5	7
Times less than 3°.0	13	6	6	7	9	10	12	12	11	8	7	7	8

* The statements of the average temperature by months and for the several years, on which this exhibit is based, were taken from the Annual Reports of the Michigan State Board of Agriculture. It will be noticed that this makes the temperature for several months in 1877 slightly different from what it was stated in the Report of the State Board of Health for 1878, and elsewhere in this Report, as compiled in this office from copies of the Agricultural College registers. The discrepancies may have arisen from errors in computation, or in copying, or in printing.

† The average variation for the 168 months of the 14 years, 1864-77, is 2°.95; the extreme range, 25°.25.

At the Agricultural College the average daily temperature was higher by 0.87 degrees in 1878 than in 1877, and 1.76 degrees higher than the average for the 14 preceding years, at the same place; and the range of temperature for the year 1878 was two degrees less than for 1877, and 11 degrees less than the average range for the five preceding years. Exhibit 12, page 341, compares the average temperature, for the year and by months, in 1878 with that in 1877 and with the average for the 14 preceding years. Though the differences are not the same in this comparison of the temperature in 1878 with that in 1877, at the Agricultural College, as when (in Exhibit 11) the average for 14 localities in 1878 is compared with the average for 12 localities in 1877, the same months are found to have been colder, and the same warmer, in 1878 than in 1877, by the one comparison as by the other.

It has been asked, How small a variation in the mean temperature of a month from the average temperature for that month for a period of years shall be considered "unusual," or when shall the mean temperature of a given month be considered usual? This can be determined only by a study of a period of years. Exhibit 13, page 342, gives by months for each of the 14 years 1864–77 the variation of the monthly temperature from the average temperature for the corresponding months of this period, and also the variation in the annual temperature in each of the same years from the average annual temperature for the period. Of the 168 months included in this period, the variation from the mean monthly temperature was,—

Less than 1°.0, in 37 months;	Less than 2°.5, in 86 months;
Less than 1°.5, in 54 months;	Less than 3°.0, in 103 months.
Less than 2°.0, in 70 months;	

The average monthly variation for the entire period of 14 years is 2°.95. So far, then, as this period is representative, it would, at first, seem proper to call a variation of 3 degrees or more in the mean temperature of a month, from the average temperature for the corresponding months of a long period of years, "unusual"; or to call any month in which the mean temperature varies more than 3 degrees from the average for the corresponding months of the period unusually warm or cold, as the case may be; and to call the temperature of any month less than 3 degrees above or below the average temperature for the corresponding months of the period of years "usual". But when it is considered how greatly the variations differ for different months of the year, it will be seen than the term "usual" as applied to variations of the average temperature of a month from the average for the corresponding months of a period of years, has no uniform limits for different months of the year. Perhaps the nearest approach to accuracy would be attained by calling any month "unusually" warm or cold, as the case may be, in which the variation of the average temperature from the average temperature for that month throughout the period is greater than the average variation (during the period) for that month. For the above period of years there were as many Februaries in which the variation was more than three degrees, as Junes in which it was more than two degrees; and the average variation in February was more than twice as great as the average for June.

It is worthy of note that, for this period of 14 years, the average variation of the mean temperature for any month from the average temperature for that month during the period is least in June, July, and August, the warmest months of the year, and the months in which the heat is principally due to direct radiation from the earth and the temperature least affected by convection, or by winds; that the greatest variations in the monthly temperature

from the average monthly temperature for the period occur in Winter; and that great variations occur oftener in Winter than in Summer.

As compared with the average for the corresponding month for the 14 preceding years, the temperature at the Agricultural College in 1878 was unusually high in January, March, April, and September; unusually low in May, June, and December; and about the same as the average in the other months of the year.

The difference in temperature at the Agricultural College between the coldest February (1875) and the warmest February (1871) in the 14 years 1864–77 inclusive was 24.32 degrees, which is about equal to the difference between the average annual temperature of Michigan (46.53, Agricultural College, 14 years 1864–77) and that of Florida (70°.74, Smithsonian Tables). The difference

TABLE I.—*Average Temperature, in Degrees Fah., for the Year, and for each Month of the Year 1878, at each of 15 Stations, and also the Average for 14 Stations in Michigan—as indicated by the Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by Observers* for the State Board of Health, and for the U. S. Signal Service.*

STATIONS IN MICHIGAN.*	Geographical Divisions of the State.†	TEMPERATURE, IN DEGREES F.												
		Year 1878.	MONTHS, 1878.											
			Jan.	Feb.	Mar.	Apr.	May.	J'ne.	J'ly.	Aug.	Sept.	Oct.	Nov.	Dec.
AV. FOR 14 LOCALITIES.‡	.....	49.24	27.17	29.75	41.46	52.27	54.73	65.18	74.22	70.92	63.99	50.13	38.34	22.74
Petoskey	N.†	46.80	26.37	32.25	36.84	42.16	47.31	63.01	72.07	67.57	62.83	48.62	37.04	25.55
Nirvana	W.	47.15	25.21	28.15	40.29	50.49	52.24	64.02	73.27	67.98	60.32	45.88	35.42	22.47
Agricultural College...‡	C.	48.29	29.11	28.07	40.90	50.55	54.57	64.08	73.04	70.15	63.15	48.33	36.29	21.29
Otisville	C.	48.22	25.02	27.55	40.71	52.46	54.50	64.59	72.53	69.46	62.70	50.21	36.28	22.65
Thornville	B. & E.	49.09	26.63	28.19	41.09	52.12	55.38	65.01	73.68	70.99	63.55	51.72	37.20	23.46
Benton Harbor	S. W.	51.03	29.09	32.58	43.62	51.58	55.75	65.69	75.07	72.30	66.78	53.27	41.97	24.71
Niles	S. W.	49.70	27.42	30.86	43.40	53.32	56.07	65.27	75.10	71.08	63.98	49.86	39.33	20.67
Battle Creek	S. C.	51.46	29.08	30.81	42.63	54.71	57.01	66.92	75.11	73.26	67.25	54.08	40.90	25.80
Coldwater	S. C.	49.97	26.67	31.20	42.71	55.10	55.56	65.44	75.76	72.69	64.76	49.89	39.29	20.61
Kalamazoo	S. C.	49.19	27.12	29.89	42.24	52.87	55.13	64.80	74.13	71.43	64.10	49.12	37.97	21.54
Mendon	S. C.	48.60	26.48	29.73	41.80	53.23	55.17	64.64	73.72	71.21	63.04	47.26	37.25	19.64
Tecumseh	S. C.	49.43	27.44	29.30	41.81	53.92	56.17	65.61	75.71	71.11	63.56	49.53	37.62	21.39
Ypsilanti	S. C.	50.25	28.41	29.33	41.58	53.79	54.44	68.15	76.09	72.40	64.83	50.55	39.43	23.96
Detroit.....§	S. E.	49.87	28.80	29.90	40.90	53.30	56.00	64.90	73.90	71.60	64.40	51.70	39.40	23.60
Woodmere Cemetery	S. E.	48.61	26.58	26.82	40.84	52.70	55.43	64.49	72.95	69.77	63.70	50.08	37.63	22.30

* The Names of Observers, their Places of Observation, and the Counties in which these Places are situated, are stated in Exhibit 9, page 337.

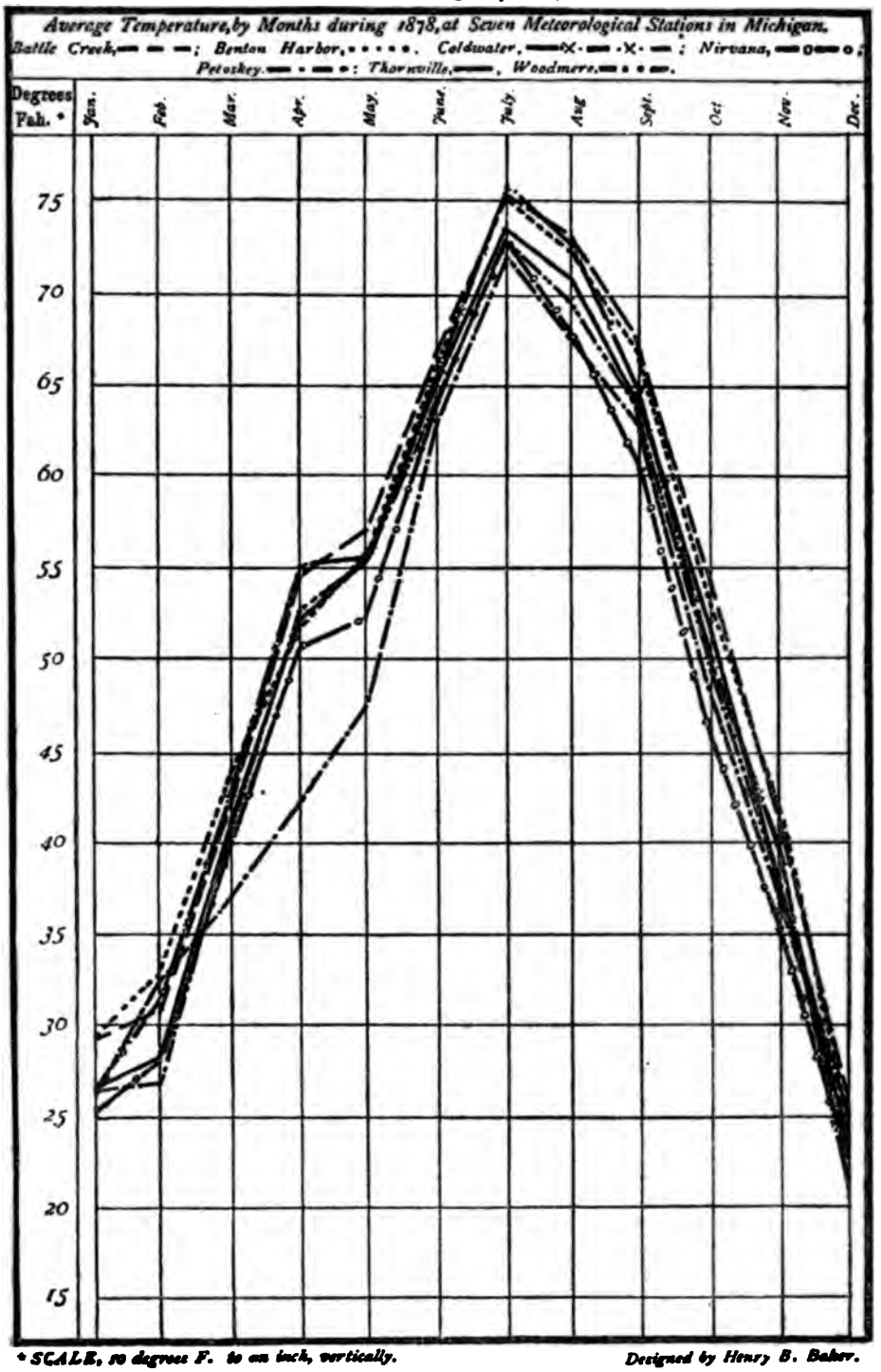
† The full names of the divisions, and the counties in each division, are stated in Exhibit 1, page 153.

‡ The line for the Agricultural College was computed at the College, and was received too late to be included in the average for all localities. The College is situated about 3¼ miles east from Lansing

§ The daily "means" from which the numbers in this line for Detroit were computed (at the Signal Service office), were found by multiplying the 9 P. M observation by 2, adding the other two observations, and dividing the sum by 4. For the other stations, the daily averages were computed by dividing the sum of the three daily observations by 3.

[The lines for seven representative localities included in Table I. are graphically represented in Diagram I., opposite this page.]

DIAGRAM No. I.—TEMPERATURE, BY MONTHS IN 1878.



* SCALE, 10 degrees F. to an inch, vertically.

Designed by Henry B. Baker.

Drawn by F. S. Redzie.

between the coldest June (1869) and the warmest June (1872) in this period was only 7°.37, which is about equal to the difference between the average annual temperature of Michigan and that of Maryland (54°.10, Blodgett). The difference between the coldest July and the warmest July in this period was 11°.59. The difference between the coldest year (1875) in this period and the warmest (1870) was 6°.05, which is about equal to the difference between the average annual temperature in Michigan and that in West Virginia (52°.25, Smithsonian Tables). Exhibit 12 states for each month of the year the range in average temperature for this period of 14 years. This range will be seen to be greatest in December, January, and February, and least in June and August.

EXHIBIT 14.—*Latitude and Longitude, Elevation above Sea Level, and the Average Temperature and Average Barometric Pressure in 1878, at 15 Meteorological Stations in Michigan,—the Names of the Stations being Arranged in order by Latitude, highest first.*

LOCALITIES IN ORDER OF LATITUDE,—THOSE FARTHEST NORTH, FIRST.	Latitude, North.*	Longitude, West from Greenwich.*	Altitude (Approximate), above sea level. —Feet.	Average Temperature, 1878.—Degrees F.	Average Atmospheric Pressure, 1878.—Inches of Mercury. Corrected for Temp.
Petoskey	45°22′	84°57′	637†	46.80°	.....
Nirvana	43°54′	85°42′	980‡	47.15	28.998‖
Otisville	43°10′	83°30′	820‡	48.22	29.040
Thornville	42°55′	83°12′	975‡	49.09	.....
Agricultural College, near Lansing	42°42′	84°31′	895§	48.29	29.053
Detroit (U. S. Sig. Service Station)	42°21′	83°7′	635†	49.87	29.268
Battle Creek	42°20′	85°11′	800†	51.46	28.651
Woodmere Cemetery (near Detroit)	42°18′	83°5′	590†	48.61	29.320
Kalamazoo	42°18′	85°35′	782†	49.19	29.037
Ypsilanti	42°15′	83°36′	700†	50.25	28.918¶
Benton Harbor	42°8′	86°28′	582†	51.03	29.482
Mendon	42°2′	85°29′	872†	48.60	29.011
Tecumseh	42°1′	83°57′	821†	49.43	29.033‖
Coldwater	41°58′	85°0′	989†	49.97	.....
Niles	41°51′	6°16′	693†	49.70	.....

* Estimated from lines on a map of Michigan issued by the General Land Office, Department of the Interior, 1878, except for Detroit and Woodmere Cemetery. The latitude and longitude of Detroit and Woodmere Cemetery were stated on the meteorological registers from those stations.
† Estimated from data on "Railroad Profiles," pages 179-187, Annual Report of the State Board of Health for 1878.
‡ Estimated from data on Tackabury's Atlas of the State of Michigan.
§ As stated on page 613, Report of the Michigan State Board of Agriculture for 1878.
‖ For last 9 months of the year. ¶ For 11 months, not including April.

The difference in temperature at the same time at places but a little separated is well illustrated by the following statement in a letter from L. P. Alden, Supt. of the State Public School, at Coldwater:—

"The State School thermometers in halls, offices, and on north side of buildings, at no time marked more than 94°, and scarcely that; but under the apple trees the mercury rose to 96° some days. Usually it stands about two or three degrees higher in a hot day under the shade trees than in or around our buildings. Thermometers in the city where there was reflected heat registered 98°."

When, however, we compute averages for complete months—thirty days, three observations each day, averaging ninety observations in each month—we find that the variations tend to neutralize each other, so that the averages for the different stations are very much alike, as will be seen by Table I., and especially by Diagram I., where the lines representing widely separated stations run close together.

EXHIBIT 15.—*Comparison of the Extremes and the Range of Temperature (Degrees Fahr.) during the Year, and during each Month of the Year 1878, with the Average of the Extremes and of the Range for the Five Years, 1873-7, and also with the Year 1877; also Statement of the Extremes and of the Range for each of the Five Years 1873-7.—Compiled in the office of the State Board of Health, from Records of Observations made with Registering Thermometers (except for the first two Months of 1873, and for those two Months with an Ordinary Thermometer at 7 A. M., 2 P. M., and 9 P. M.) Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan, and near the center of the thickly-settled part of the State.*

Year and Months.	Extremes and Ranges of Temperature,—Degrees F.																					1878 Compared with Previous Years.					
	1873.			1874.			1875.			1876.			1877.			Average for 5 Years, 1873-7.			1878.			In 1878 Higher (+), or Lower (-), than Av. for 5 Years, 1873-7.			In 1878 Higher (+), or Lower (-), than in 1877.		
	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.
Year	94°	-30°	124°	101°	-7°	108°	92°	-33°	125°	96°	-19°	115°	93°	-14°	107°	*95°	*-21°	*116°	98°	-7°	105°	+3°	+14°	-11°	+5°	+7°	-2°
January	43°	-30°	73°	59°	-7°	66°	35°	-13°	48°	65°	6°	59°	52°	-9°	61°	51°	-11°	61°	48°	-4°	52°	-3°	+7°	-9°	-4°	+5°	-9°
February	49	-13	62	48	-1	49	42	-33	75	59	-1	60	56	10	46	51	-8	58	55	-7	62	+4	+1	+4	-1	+17	+16
March	57	-12	69	67	8	59	75	-11	86	60	0	60	51	-14	65	62	-6	68	72	18	54	+10	+24	-14	+21	+32	-11
April	82	24	58	68	3	65	80	0	80	74	16	58	81	18	63	77	12	65	75	29	46	-2	+17	-19	-6	+11	-17
May	84	27	57	96	21	75	89	24	65	89	31	58	90	26	64	90	26	64	77	29	48	-13	+3	-16	-13	+3	-16
June	94	42	52	95	34	61	89	33	56	95	42	53	89	40	49	92	38	54	94	39	55	+2	+1	+1	+5	-1	+6
July	92	44	48	98	43	55	92	44	48	96	46	50	91	43	48	94	44	50	98	47	51	+4	+3	+1	+7	+4	+3
August	94	44	50	101	41	60	93	35	58	96	36	60	93	43	50	95	40	56	93	42	51	-2	+2	-5	0	-1	+1
September	89	26	63	95	30	65	94	26	68	80	36	44	85	38	47	89	31	57	92	31	61	+3	0	+4	+7	-7	+14
October	79	16	63	76	16	60	77	18	59	75	19	56	87	26	61	79	19	60	82	21	61	+3	+2	+1	-5	-5	0
November	56	1	55	70	3	67	60	2	58	62	12	50	55	4	51	61	4	56	52	15	37	-9	+11	-19	-3	+11	-14
December	64	10	54	50	-6	56	70	-1	71	41	-19	60	58	13	45	57	-1	57	36	-2	38	-21	-1	-19	-22	+15	-7

* For the five years: highest, 101°, August 11, 1874; lowest, -33°, February 8, 1875; range, 134°.

of Health, and for the U. S. Signal Service.

PLACES OF OBSERVATION IN MICHIGAN.*	Geographical Division of the State.†	YEAR 1878. Highest.	Lowest.	Range.	MONTHS, 1878. January. Highest.	Lowest.	Feb. Highest.	Lowest.	March. Highest.	Lowest.	April. Highest.	Lowest.	May. Highest.	Lowest.	June. Highest.	Lowest.	July. Highest.	Lowest.	August. Highest.	Lowest.	Sept. Highest.	Lowest.	October. Highest.	Lowest.	Nov. Highest.	Lowest.	December. Highest.	Lowest.
AT 15 LOCALITIES	.....	100	-14	114	55	-11	60	-14	79	8	85	24	85	25	96	31	100	46	94	40	92	29	85	13	68	15	49	-9
Petoskey *	N.†	97	2	95	40^{19}	2^{28}	52^{7}	6^{18}	78^{9}	8^{24}	70^{20}	30^{3}	76^{24}	33^{9}	94^{29}	43^{12}	97^{16}	60^{27}	90^{8}	56^{25}	82^{9}	44^{22}	76^{1}	28^{31}	52^{12}	21^{27}	36^{3}	12^{24}
Nirvana	W.	95	-9	104	46^{19}	-9^{5}	53^{28}	0^{18}	73^{9}	17^{24}	76^{19}	24^{7}	78^{31}	31^{12}	92^{29}	41^{10}	95^{19}	53^{23}	94^{8}	49^{25}	88^{3}	29^{27}	75^{1}	13^{28}	49^{10}	15^{27}	37^{2}	-2^{16}
Agricultural College, near Lansing §†	C.	98	-7	105	48^{19}	-4^{5}	55^{20}	-7^{2}	72^{9}	18^{24}	75_{a}^{19}	29_{b}^{4}	77_{c}^{2}	29^{19}	94^{29}	39^{11}	98^{17}	47^{22}	93^{8}	42^{26}	92^{1}	31^{21}	82^{1}	21^{27}	52^{2}	15^{29}	36^{1}	-2^{22}
Otisville §	C.	99	-11	110	51^{19}	-11^{6}	49^{28}	-5^{3}	75^{10}	13^{25}	79^{20}	26^{5}	79^{3}	25^{13}	95^{30}	31^{9}	99^{18}	46^{23}	91^{9}	40^{26}	91^{2}	32^{28}	82^{1}	20^{28}	56^{11}	15^{5}	49^{1}	-1^{24}
Thornville §	B. & E.	96	0	96	46^{19}	0^{7}	50^{28}	7^{11}	67^{10}	16^{25}	70^{20}	30^{7}	78^{2}	32^{11}	91^{30}	36^{6}	96^{17}	50^{24}	88^{8}	47^{27}	85^{8}	33^{22}	80^{1}	25^{27}	54^{10}	20^{5}	41^{9}	4^{12}
Benton Harbor	S. W.	95	3	92	48^{19}	5^{5}	55^{7}	5^{3}	75^{9}	25^{25}	82^{19}	32^{1}	79^{23}	42^{14}	93^{30}	51^{21}	95^{16}	61^{2}	86^{13}	53^{26}	90^{8}	41^{27}	85^{1}	32^{31}	58^{19}	26^{26}	41^{3}	3^{23}
Niles	S. W.	94	-10	104	49^{20}	-8^{5}	54^{20}	4^{10}	70^{9}	23^{25}	73^{19}	31^{6}	74^{24}	36^{10}	91^{29}	47^{10}	94^{16}	60^{2}	88^{8}	55^{26}	85^{7}	42^{27}	79^{1}	24^{31}	68^{6}	22^{14}	39^{2}	-10^{24}
Battle Creek §	S. C.	92	-9	101	55^{18}	5^{5}	60^{20}	-9^{2}	79^{9}	13^{24}	85^{19}	32^{5}	85^{31}	31^{10}	88^{29}	42^{8}	92^{17}	58^{2}	88^{8}	52^{25}	85^{8}	39^{26}	81^{1}	28^{31}	54^{19}	25^{26}	44^{3}	0^{23}
Coldwater	S. C.	94	-8	102	51^{19}	1^{7}	60^{20}	-2^{10}	68^{10}	14^{26}	74^{19}	32^{6}	72^{25}	38^{14}	90^{30}	50^{21}	94^{17}	60^{22}	90^{4}	54^{27}	86^{9}	48^{27}	78^{1}	26^{31}	64^{19}	22^{26}	40^{3}	-8^{24}
Kalamazoo §	S. C.	94	-9	103	45^{18}	2^{5}	52^{20}	-6^{3}	71^{9}	15^{24}	76^{19}	29^{5}	77^{24}	29^{10}	93^{29}	41^{10}	94^{16}	51^{21}	90^{8}	41^{25}	89^{8}	35^{26}	81^{1}	18^{31}	53^{6}	17^{26}	39^{3}	-9^{22}
Mendon	S. C.	96	-8	104	47^{19}	5^{7}	54^{28}	-4^{3}	70^{9}	20^{24}	74^{19}	33^{7}	76^{2}	36^{11}	91^{29}	47^{9}	96^{17}	58^{24}	90^{8}	49^{26}	86^{8}	40^{27}	81^{1}	23^{28}	52^{6}	19^{30}	39^{3}	-8^{24}
Tecumseh	S. C.	100	-5	105	52^{19}	1^{29}	60^{28}	4^{2}	75^{9}	20^{24}	77^{20}	32^{2}	80^{24}	36^{14}	95^{29}	44^{8}	100^{17}	60^{22}	94^{8}	51^{26}	89^{8}	41^{27}	78^{14}	21^{28}	52^{2}	20^{30}	37^{2}	-5^{24}
Ypsilanti	S. C.	98	-10	108	51^{19}	4^{6}	54^{28}	-10^{3}	72^{9}	21^{24}	77^{19}	35^{1}	77^{2}	39^{13}	96^{30}	38^{8}	98^{17}	51^{23}	92^{8}	43^{26}	90^{8}	37^{28}	83^{1}	22^{28}	57^{12}	20^{30}	44^{9}	-2^{24}
Detroit §	S. E.	100	-4	104	50^{19}	0^{7}	52^{28}	7^{3}	68^{9}	16^{25}	77^{23}	31^{7}	78^{2}	33^{11}	92^{30}	42^{9}	100^{17}	56^{23}	90^{8}	51^{26}	85^{6}	39^{27}	79^{1}	24^{28}	53^{10}	24^{7}	42^{1}	-4^{24}
Woodmere Cemetery, near Detroit §	S. E.	97	-14	111	49^{20}	0^{7}	51^{28}	-14^{3}	70^{9}	18^{24}	74^{23}	29^{5}	79^{20}	39^{15}	92^{30}	35^{9}	97^{17}	50^{22}	90^{8}	[illegible]	85^{7}	34^{22}	80^{1}	25^{28}	55^{10}	18^{5}	41^{2}	-3^{24}

NOTE.—The small figures above and at the right of numbers denoting the degrees of temperature, state the day of the month on which the highest or the lowest temperature occurred. In some cases as great an extreme was reached on other days not noted in this table.

* The Names of Observers, etc., are stated in Exhibit 9, page 337. a Also on the 30th. b Also on the 6th. c Also on the 24th.

† The full names of the divisions, and the counties in each division, are stated in Exhibit 1, page 153.

§ Determined by daily readings of registering thermometers made and recorded at 7 A. M. for the preceding calendar day. But at Otisville the observations were recorded for the calender day on which they were made; and at Woodmere Cemetery, from and after March 10, 1878, the observations on the registering thermometers were made at 9 P. M. and recorded for the day on which they were made. For Ypsilanti the extremes were determined from the 7 A. M., 2 P. M., and 9 P. M. observations for the first 5 months of the year; but for the last 7 months the highest temperature was thus determined, and the lowest temperature was determined by a registering minimum thermometer. For other stations not indicated by this mark (§) the extremes were determined from the 7 A. M., 2 P. M., and 9 P. M. observations.

EXHIBIT 16.—*Comparison of the Average Daily Range of Temperature for the Year and for each Month of the Year 1878 with Averages for the 8 Years, 1870–77, and for the Year 1877,—as indicated by Observations made at 7 A. M., 2 P. M., and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

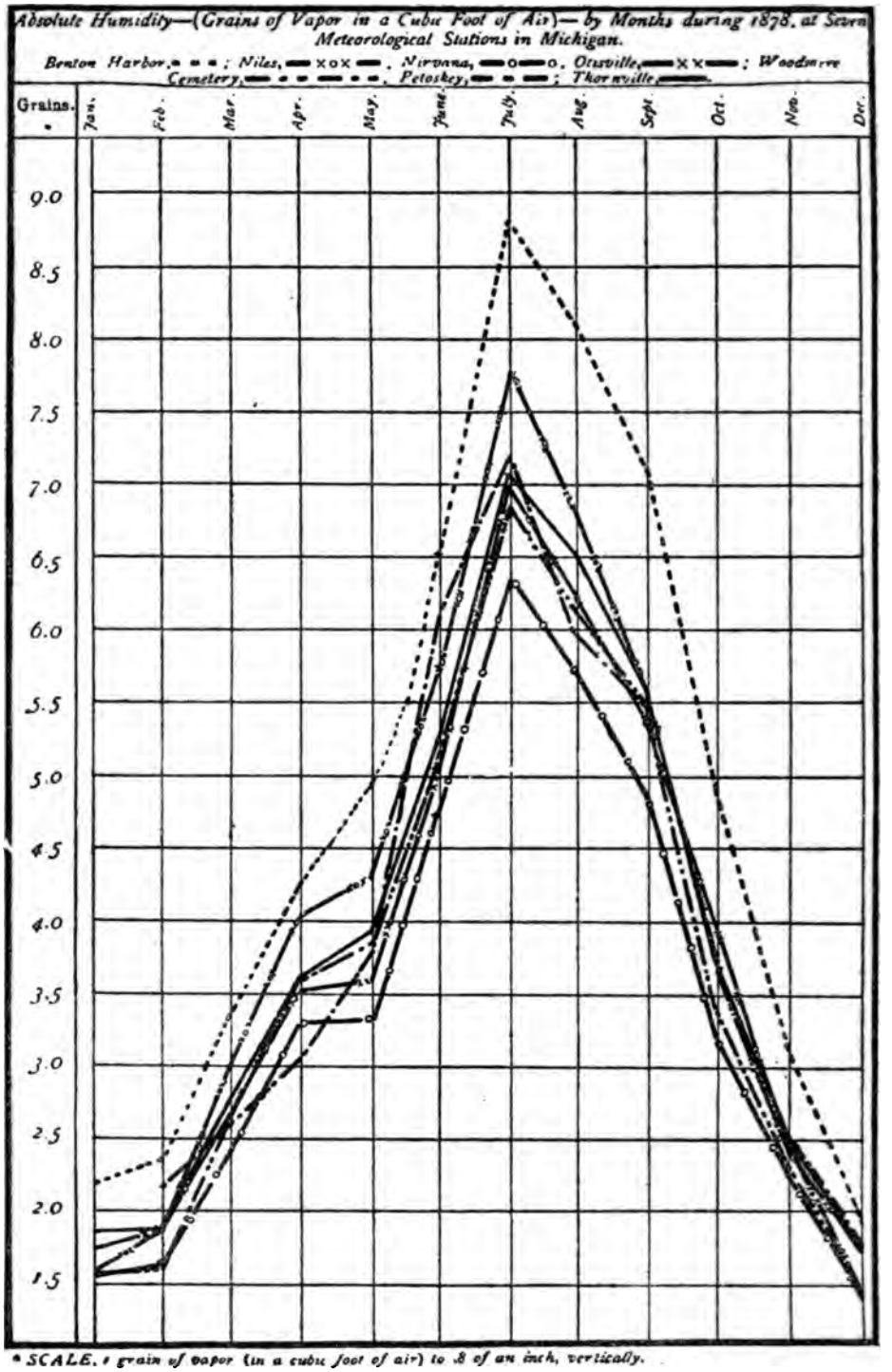
YEARS, ETC.	Average Daily Range of Temperature,—Degrees Fahr.												
	Annual Av.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
8 Years, 1870–77..	15.80	11.52	15.99	15.29	16.74	16.83	17.33	17.31	17.89	19.71	16.89	13.25	10.87
1877.....	15.06	12.26	14.86	15.19	16.13	16.52	17.37	18.07	17.45	18.97	13.81	11.47	8.77
1878.....	13.56	8.74	14.55	12.06	14.07	13.08	15.80	14.29	17.71	17.43	15.77	11.57	7.90
In 1878, Less than Av. for 8 Years, 1870–77..	2.24	2.78	1.44	3.23	2.67	3.75	1.53	3.02	0.18	2.28	1.12	1.68	2.97
In 1878, Greater than in 1877.....	.....	.....	.....	.....	.....	.....	.....	.....	0.26	.....	1.96	0.10	.....
In 1878, Less than in 1877.....	2.50	3.52	0.31	3.13	2.06	3.44	1.57	3.78	.....	1.54	.....	.....	0.87

HUMIDITY OF THE ATMOSPHERE.

The humidity of the atmosphere bears a very close relation to the temperature, generally increasing with a rise in the temperature and decreasing with a fall. This is true even in respect to the daily changes in temperature. The *per cent of saturation* of the air with moisture, or the relative humidity, is, however, generally greater the lower the temperature. Statements of both the absolute and the relative humidity in 1878, and comparisons, in respect to both, of 1878 with averages for preceding years, are given in the accompanying tables and exhibits. By the comparison in Exhibit 17, page 353, of the average absolute humidity for 12 stations in 1878 with the average for 9 stations in 1877, the absolute humidity was greater in 1878 than in 1877 in every month in which the temperature was higher than in 1877; and less in every month in which the temperature was lower than in 1877. By the comparison in Exhibit 18, page 354, of the absolute humidity at the Agricultural College in 1878 with averages for the 12 preceding years and with 1877, the absolute humidity was less in 1878 than in 1877 in every month in which the temperature was lower than in 1877; and greater in every month (except November) in which the temperature was higher than in 1877. In November the absolute humidity at the College was the same in both years, while the temperature was 1°.09 higher in 1878 than in 1877.

Compared with averages for 14 years, at the Agricultural College, the relative humidity in 1878 was less for the year, greater in January, February, November, and December, and less for the other months. Compared with 1877, the relative humidity was less for the year, greater in February and December, and less for the other months.

DIAGRAM No. II.—ABSOLUTE HUMIDITY, BY MONTHS IN 1878.



* SCALE. 1 grain of vapor (in a cubic foot of air) to .8 of an inch, vertically.

Drawn by F. S. Redson. Designed by Henry B. Baker.

TABLE III.—*The Average Number of Grains of Vapor of Water in a Cubic Foot of Air (Absolute Humidity), for Months and Year 1878, at 12 Stations in Michigan.—Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by Observers* for the State Board of Health, and for the U. S. Signal Service.*

PLACES OF OBSERVATION IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	GRAINS OF VAPOR IN A CUBIC FOOT OF AIR.												
		YEAR 1878.	MONTHS, 1878.											
			Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average for 12 localities‡	.....	3.81	1.73	1.83	2.79	3.68	3.88	5.26	7.14	6.37	5.44	3.62	2.47	1.54
Potoskey*	N.†	..§..	.....	2.14	2.66	3.05	3.79	6.10	7.16	5.98	5.45	3.69	2.44	1.77
Nirvana	W.	3.40	1.54	1.65	2.43	3.31	3.33	4.73	6.35	5.73	4.87	3.23	2.25	1.43
Agricultural College, near Lansing	C.	3.69	1.82	1.91	2.80	3.51	3.68	5.05	6.83	6.06	5.18	3.38	2.44	1.02
Otisville	C.	3.76	1.76	1.88	2.68	3.52	3.60	5.02	6.98	6.26	5.35	3.95	2.43	1.72
Thornville	B. & E.	3.87	1.85	1.88	2.78	3.62	3.93	5.25	7.08	6.52	5.56	3.72	2.47	1.72
Benton Harbor	S. W.	4.80	2.18	2.36	3.35	4.24	4.96	6.51	8.79	8.11	7.10	4.91	3.18	1.95
Niles	S. W.	4.02	1.56	1.88	2.99	4.02	4.30	5.75	7.78	6.85	5.59	3.69	2.48	1.40
Battle Creek	S. C.	3.67	1.58	1.79	2.74	3.61	3.70	5.07	6.77	5.96	5.24	3.52	2.49	1.53
Coldwater	S. C.	3.94	1.71	1.81	3.17	4.24	4.24	5.85	7.30	6.40	5.20	3.47	2.51	1.43
Kalamazoo	S. C.	3.62	1.64	1.75	2.75	3.57	3.74	4.95	6.86	5.94	5.01	3.37	2.41	1.43
Mendon	S. C.	3.78	1.74	1.85	2.73	3.64	3.77	5.14	7.33	6.41	5.23	3.54	2.44	1.52
Tecumseh	S. C.	3.87	1.94	2.00	2.81	3.71	3.95	5.26	7.05	6.38	5.60	3.67	2.52	1.55
Detroit	S. E.	3.34	1.64	1.55	2.35	3.10	3.23	4.47	6.51	5.68	5.02	2.97	2.14	1.37
Woodmere Cemetery, near Detroit	S. E.	3.68	1.58	1.61	2.69	3.60	3.84	5.09	6.86	6.17	5.49	3.43	2.36	1.44

* The Names of Observers, their Places of Observation, and the Counties in which these Places are situated, are stated in Exhibit 9, page 337.
† The full names of the divisions and the counties in each division, are stated in Exhibit 1, page 153.
‡ This line is an average for only the stations for which statements are given for every month of the year, not, however, including the line for the Agricultural College, which was received too late to be included in the average.
§ For 11 months, 4.02.

The lines for seven representative localities included in Table III., are graphically represented in Diagram II., opposite this page.

EXHIBIT 17.—*Comparison by Year and Months of the Average Absolute Humidity (Grains of Vapor in a Cubic Foot of Air) at 12 Stations in 1878 with the Average at 9 Stations in 1877.**

YEARS, ETC.	GRAINS OF VAPOR IN A CUBIC FOOT OF AIR.—(ABSOLUTE HUMIDITY.)												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 9 Stations in 1877*	3.71	1.37	1.87	1.61	2.83	4.10	5.67	6.33	6.24	5.37	4.08	2.46	2.61
Av. for 12 Stations in 1878*	3.81	1.73	1.83	2.79	3.68	3.88	5.26	7.14	6.37	5.44	3.62	2.47	1.54
In 1878 Greater than in 1877	0.10	0.36	.....	1.18	0.85	.....	.....	0.81	0.13	0.07	.....	0.01	.....
In 1878 Less than in 1877	.....	.....	0.04	.....	.....	0.22	0.41	.....	.....	.....	0.46	.....	1.07

* Eight of the stations, namely, Thornville, Benton Harbor, Battle Creek, Coldwater, Kalamazoo, Mendon, Detroit, and Woodmere Cemetery, were the same for both years; one, the Agricultural College, was included in the average for 1877, but not in that for 1878; four, namely, Nirvana, Otisville, Niles, and Tecumseh, were included in the average for 1878, but not in that for 1877.

EXHIBIT 18.—*Comparison of the Absolute Humidity of the Air (Grains of Vapor in a Cubic Foot of Air) in the Year and in each Month of the Year 1878, with Averages for the 12 Years 1866-77, and for the Year 1877.—Observations made at 7 A. M., 2 P. M., and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

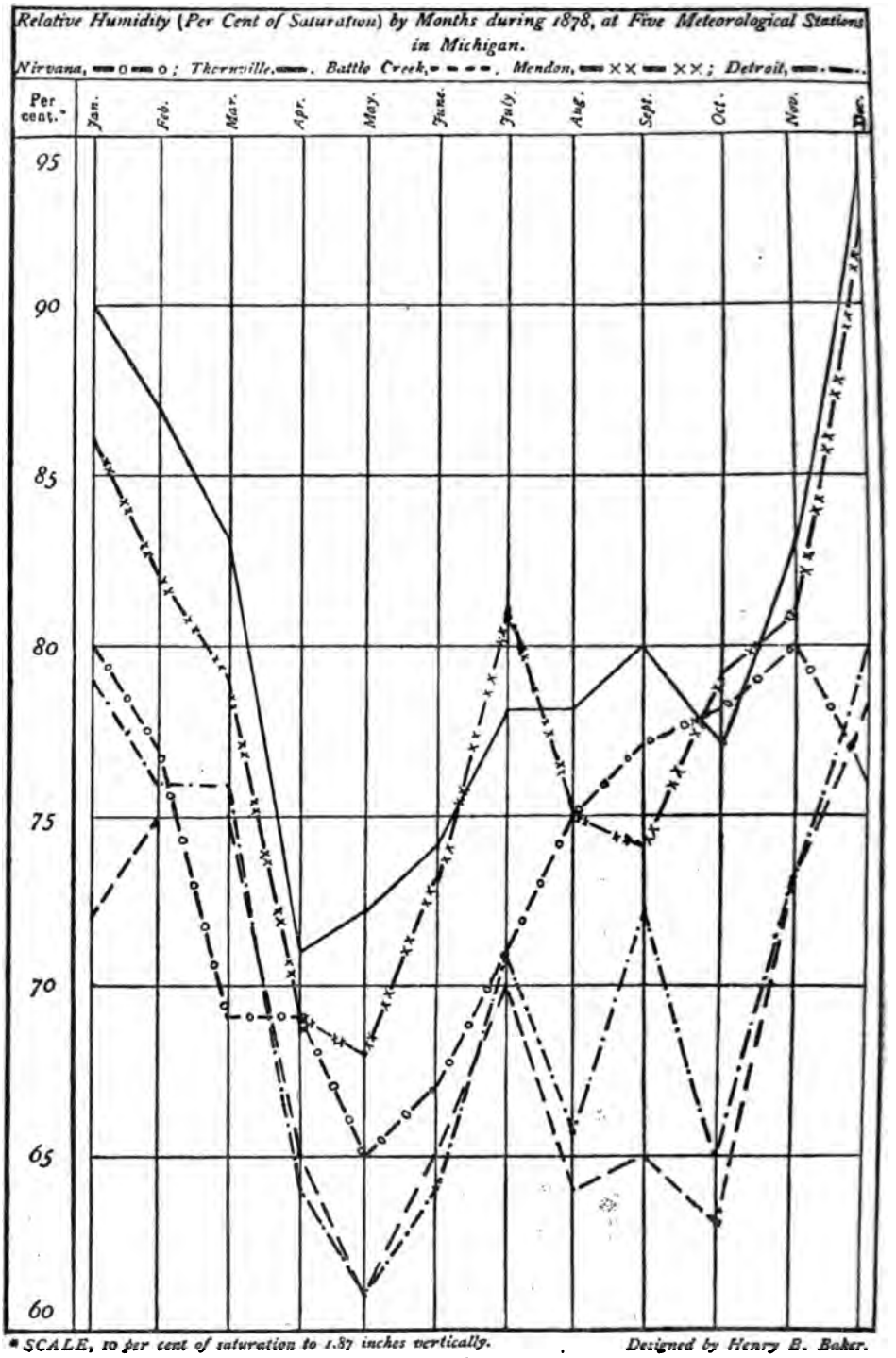
YEARS,* ETC.	ABSOLUTE HUMIDITY,—Grains of Vapor in a Cubic Foot of Air.												
	Annual Av.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
12 Years, 1866-77*.	3.43	1.40	1.47	1.77	2.60	3.87	5.67	6.65	6.09	4.78	3.16	2.08	1.59
1877*	3.63	1.39	2.10	1.73	2.85	4.16	5.52	5.96	5.94	5.03	3.80	2.44	2.58
1878*	3.69	1.82	1.91	2.80	3.51	3.68	5.05	6.83	6.06	5.18	3.38	2.44	1.62
In 1878 Greater than Av. for 12 Years, 1866-77	.26	.42	.44	1.03	.91	.....	.....	.18	.....	.40	.22	.36	.03
In 1878 Less than Av. for 12 Years, 1866-77	.....	.....	.....	.....	.....	.19	.62	.....	.03	.....	.....	.....	.....
In 1878 Greater than in 1877	.06	.43	.....	1.07	.66	.....	.....	.87	.12	.15	.....	0	.....
In 1878 Less than in 1877	.....	.....	.19	.....	.....	.48	.47	.....	.....	.....	.42	0	.96

* Eleven years 1866-76 computed in the State Department, for the Vital Statistics of Michigan, from statements of Temperature and Force of Vapor. Two years 1877 and 1878 computed in the office of the State Board of Health, from readings of the dry-bulb and wet-bulb thermometers.

RELATIVE HUMIDITY.

Although the absolute humidity of the atmosphere has been found, in this State, to have very important relations to several diseases, and no such very close relation has been shown with relative humidity, yet it has been thought best to include in this article the evidence on the subject of relative humidity, especially as it has generally been supposed to have important relations to health. Something similar might be said of the rainfall, which has been supposed to have important relations to health, but which when studied, as it has been in this State for a number of years, seems to have no such apparent relations. Nevertheless, time and continued study may reveal facts of sufficient importance to repay for the effort. Exhibit 19 permits of a comparison of the several months in 1878 with the average for the same months in a series of years preceding 1878, at one central station in Michigan. Table IV. permits comparisons of the several months in 1878 at each of 13 stations in Michigan, and also of the stations with each other; and Diagram III. pictures to the eye the essential facts tabulated for five of the stations in different parts of the State.

DIAGRAM No. III.—RELATIVE HUMIDITY, BY MONTHS IN 1878.



* SCALE, 10 per cent of saturation to 1.37 inches vertically.

Designed by Henry B. Baker.

Drawn by M. S. Collier.

EXHIBIT 10.—*Comparison of the Average Relative Humidity of the Air (Per Cent of Saturation) for the Year and for each Month of the Year 1878, with Averages for the 14 Years, 1864–77, and for 1877.—Observations made at 7 A. M., 2 P. M., and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

YEARS, ETC.	PER CENT OF SATURATION.												
	Annual Av.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 14 years, 1864–77	80	85	85	85	72	69	76	76	78	81	80	82	85
1877	81	91	85	91	70	67	75	70	77	80	83	88	89
1878	78	89	89	83	69	61	73	68	74	78	76	87	95
In 1878 Greater than Av. for 14 years, 1864–77	.....	4	4	.....	.....	.....	.....	.....	.....	.....	.....	5	10
In 1878 Less than Av. for 14 years, 1864–77	2	.....	.....	2	3	8	3	8	4	3	4	.....	.....
In 1878 Greater than in 1877	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	6
In 1878 Less than in 1877	3	2	.....	8	1	6	2	2	3	2	7	1	.....

TABLE IV.—*Average Per Cent of Saturation of the Atmosphere with Vapor of Water (Relative Humidity) during the Year and during each Month of the Year 1878, at 12 Stations in Michigan,—Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by Observers* for the State Board of Health, and for the U. S. Signal Service.*

PLACES OF OBSERVATION IN MICHIGAN.*	GEOGRAPHICAL DIVISION OF THE STATE. †	PER CENT OF SATURATION,—RELATIVE HUMIDITY.												
		YEAR 1878.	MONTHS, 1878.											
			Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
AV. FOR 11 LOCALITIES‡	.....	77	83	80	79	71	69	71	76	74	76	75	79	86
Petoskey*	N.†	§	....	89	91	88	90	90	82	80	81	84	84	94
Nirvana	W.	74	80	77	69	69	65	67	71	75	77	78	80	76
Agricultural College, near Lansing	C.	78	89	89	83	69	61	73	68	74	78	76	87	95
Otisville	C.	81	91	87	80	69	66	69	80	79	81	87	85	97
Thornville	B. & E.	81	90	87	83	71	72	74	78	78	80	77	83	94
Niles	S. W.	79	76	79	81	79	76	78	82	81	79	79	77	80
Battle Creek	S. C.	69	72	75	75	65	61	65	70	64	65	63	73	78
Coldwater	S. C.	78	83	73	87	79	78	80	74	70	71	74	78	88
Kalamazoo	S. C.	75	81	77	78	69	68	70	74	69	71	72	80	86
Mendon	S. C.	78	86	82	79	69	68	73	81	75	74	79	81	93
Tecumseh	S. C.	80	93	87	83	71	71	73	75	76	82	81	83	90
Detroit	S. E.	71	79	76	76	64	61	64	71	66	72	65	73	80
Woodmere Cemetery, near Detroit	S. E.	77	78	79	79	71	69	72	77	77	79	74	78	83

* The Names of Observers, their Places of Observation, and the Counties in which these Places are situated, are stated in Exhibit 9, page 337.

† The full names of the divisions and the counties in each division are stated in Exhibit 1, page 153.

‡ This line is an average for only the 11 localities from which reports were received for every month of the year; not, however, including the Agricultural College line, which was received too late to be included in the average.

§ For the 11 months, 86.

Graphic representations of 5 representative lines in this table are given in Diagram III., opposite this page.

CLOUDINESS.

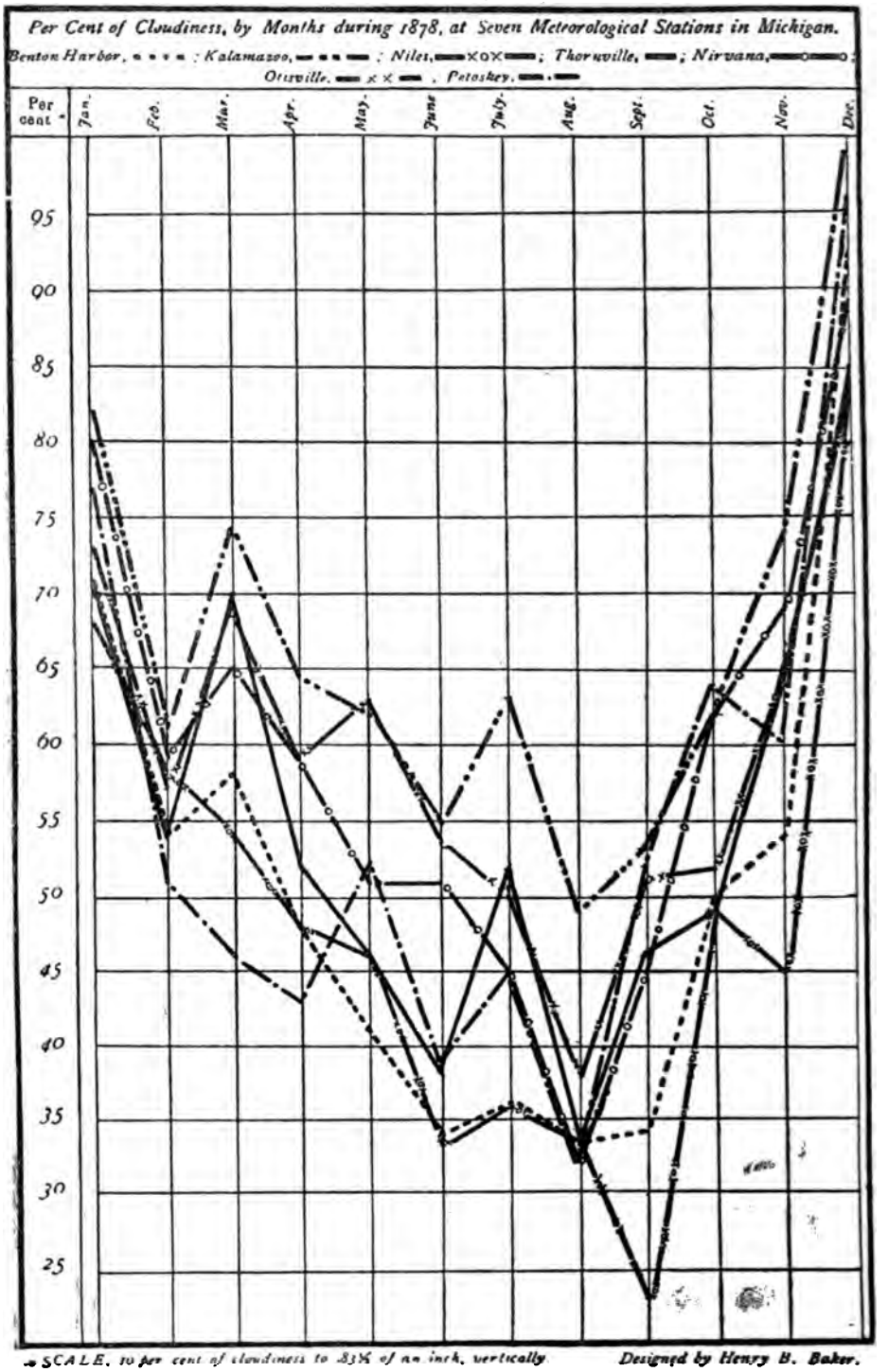
By comparing Diagrams III. and IV. it may be seen that there is a general correspondence between the relative humidity, observed near the surface of the earth, and the cloudiness of the sky. This comparison can be made in detail by means of Exhibits 19 and 21, which contain statements for fourteen years at one central station, from which it appears that the relative humidity is usually lowest at that place in May, while the cloudiness is usually least in July and August. Exhibit 21, below, also permits comparisons of each of the months of the year 1878 with the average for the corresponding months during the period of 14 years. It may thus be seen that March and December, 1878, were unusually cloudy, and June, July, August, September, and October, 1878, were months of less than usual cloudiness, compared with corresponding months during a series of years preceding 1878. Comparing the several months of the year 1878 with each other, as may be done in Exhibit 20, page 361, using the average of 12 stations, it may be seen that December and January were the most cloudy months, and that the per cent of clouds was least in August.

Table V. permits a comparison of months to be made for each of 14 stations in Michigan, and also a comparison of the stations with each other; and the general comparisons are facilitated by Diagram IV., page 360.

EXHIBIT 21.—*Comparison of the Average Per Cent of Cloudiness in the Year and in each Month of the Year 1878, with Averages for the 14 Years 1864–77, and for the Year 1877.—Observations made at 7 A. M., 2 P. M., and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

YEARS, ETC.	PER CENT OF CLOUDINESS.												
	Annual Av.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
14 years, 1864–77..	59	74	64	64	58	52	50	48	49	50	59	68	75
1877.....	53	64	41	62	50	34	51	44	47	38	66	73	72
1878.....	58	76	56	72	59	54	45	37	40	45	54	68	89
In 1878 Greater than Av. for 14 Years, 1864–77....	.....	2	.....	8	1	2	.....	.....	.....	.....	.....	0	14
In 1878 Less than Av. for 14 Years, 1864–77....	1	.....	8	.....	.....	.....	5	11	9	5	5	0	.....
In 1878 Greater than in 1877.....	5	12	15	10	9	20	.....	.....	.....	9	.....	.....	17
In 1878 Less than in 1877.....	.....	.....	.....	.....	.....	.....	6	7	7	.....	12	5	.....

DIAGRAM No. IV —CLOUDINESS, BY MONTHS IN 1878.



SCALE, 10 per cent of cloudiness to .83¼ of an inch, vertically.

Designed by Henry B. Baker.

Drawn by F. S. Kedzie

EXHIBIT 20.—*Comparison, by Year and Months, of the Average Per Cent of Cloudiness at 12 Stations in 1878 with the Average at 13 Stations in 1877.**

YEARS, ETC.	AVERAGE PER CENT OF CLOUDINESS.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 13 Stations in 1877*	51	65	44	63	47	36	47	36	42	35	63	71	68
Av. for 12 Stations in 1878*	54	71	55	62	53	48	41	45	34	48	52	57	83
In 1878 Greater than in 1877	3	6	11	.....	6	12	.....	9	.....	13	.....	.....	15
In 1878 Less than in 1877	.....	.....	.....	1	.....	.....	6	.....	8	.....	11	14	.....

*Nine of the stations, namely, Nirvana, Thornville, Benton Harbor, Battle Creek, Coldwater, Kalamazoo, Mendon, Tecumseh, and Woodmere Cemetery (near Detroit), were the same for both years; four, Fife Lake, Agricultural College (near Lansing), Ypsilanti, and Detroit, were included in the average for 1877 but not in that for 1878; and three, Petoskey, Otisville, and Niles, were included in the average for 1878 but not in that for 1877.

TABLE V.—*Average Per Cent of Cloudiness, for the Year and for each Month of the Year 1878, at 13 Stations in Michigan.—Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by Observers for the State Board of Health.**

PLACES OF OBSERVATION IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	AVERAGE PER CENT OF CLOUDINESS.												
		YEAR 1878.	MONTHS, 1878.											
			Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
AV. FOR 12 LOCALITIES‡	.....	54	71	55	62	53	48	41	45	34	48	52	57	83
Petoskey*	N.†	55	77	51	46	43	52	39	45	32	52	64	60	96
Nirvana	W.	59	80	59	65	59	51	51	45	32	45	62	69	89
Agricultural College, near Lansing	C.	58	76	56	72	59	54	45	37	40	45	54	68	89
Otisville	C.	60	73	57	69	59	63	54	50	38	51	52	65	83
Thornville	B. & E.	55	71	54	70	52	46	37	52	33	46	49	64	85
Benton Harbor	S. W.	50	71	54	58	48	41	34	36	33	34	50	54	92
Niles	S. W.	48	68	58	54	48	46	33	36	33	23	49	45	84
Battle Creek	S. C.	51	63	48	62	51	46	38	47	36	37	51	52	85
Coldwater	S. C.	45	51	54	56	47	37	38	42	36	33	48	46	53
Kalamazoo	S. C.	67	82	64	74	64	62	55	63	49	53	62	74	99
Mendon	S. C.	52	69	58	68	56	45	41	48	31	31	45	51	79
Tecumseh	S. C.	50	75	55	63	53	42	36	39	30	37	46	51	76
Ypsilanti	S. C.	§	80	52	69	.....	50	36	42	31	35	47	61	85
Woodmere Cemetery, near Detroit	S. E.	51	70	53	63	53	45	38	42	27	41	45	56	75

*The Names of Observers, their Places of Observation, and the Counties in which these places are situated are stated in Exhibit 9, page 337.
†The full names of divisions and the counties in each division are stated in Exhibit 1, page 153.
‡This line is an average for only 12 of the stations from which statements were received for every month of the year; the records for the Agricultural College were not received in time to be included in the average.
§For 11 months, 53 per cent.

The lines for seven representative localities included in Table V. are graphically represented on Diagram IV., opposite this page.

RAINFALL.

The total precipitation of rain and melted snow recorded at the Agricultural College was 1.66 inches greater in 1878 than the average for the 14 preceding years, and 5.41 inches less than in 1877. In February and April the excess over the average for the corresponding months of the period was the greatest. By the comparison in Exhibit 22, below, of the average precipitation for 12 stations in 1878 with the average for 13 stations in 1877 (ten of the stations being the same for each year), the precipitation was 2.82 inches greater in 1878 than in 1877.

EXHIBIT 22.—*Comparison, by Year and Months, of the Average Rainfall at 12 Stations in 1878 with the Average at 13 Stations in 1877.**

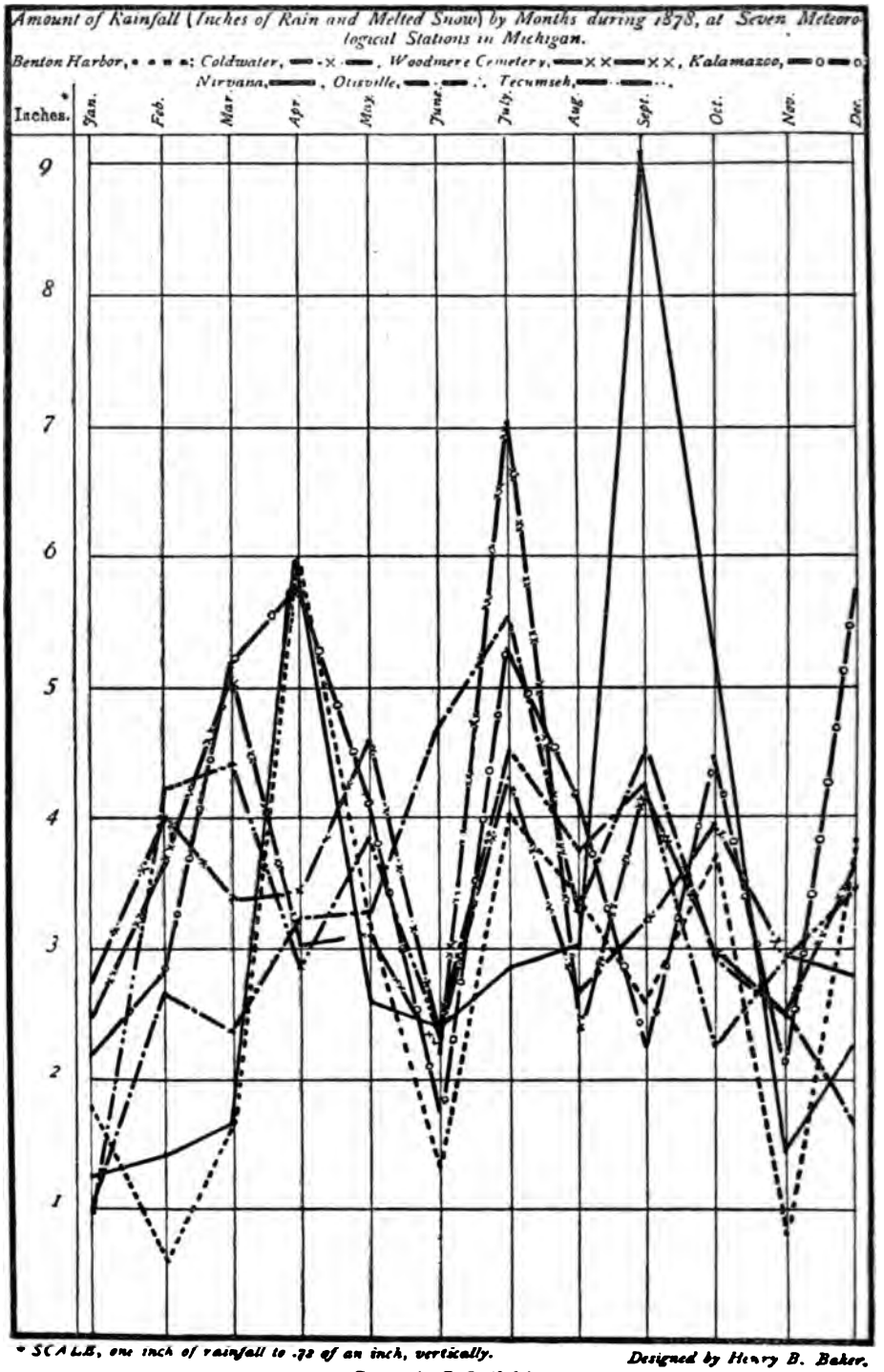
YEARS, ETC.	Inches of Rain and Melted Snow.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 13 Stations in 1877 *	35.24	1.57	0.03	4.22	2.83	1.49	4.60	3.06	5.00	1.62	5.02	4.23	1.58
Av. for 12 Stations in 1878 *	38.06	1.62	2.63	3.22	3.71	3.22	2.66	5.13	3.04	3.84	3.56	2.11	3.32
In 1878 Greater than in 1877	2.82	.05	2.60	.....	.88	1.73	.....	2.07	.....	2.22	.....	.....	1.74
In 1878 Less than in 1877	.....	.....	.....	1.00	.....	.....	1.94	.....	1.96	.....	1.46	2.12	.....

* Ten of the stations, namely, Nirvana, Thornville, Benton Harbor, Battle Creek, Coldwater, Kalamazoo, Mendon, Tecumseh, Detroit, and Woodmere Cemetery (near Detroit), were the same for both years; three, Fyfe Lake, Agricultural College (near Lansing), and Ypsilanti, were included in the average for 1877 but not in that for 1878; and two, Otisville and Niles, were included in the average for 1878 but not in that for 1877.

EXHIBIT 23.—*Comparison of the Rainfall during the Year and during each Month of the Year 1878, with that for the Year 1877, and with the Average for the fourteen Years 1864–77.—Observations made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

YEARS, ETC.	Inches of Rain and Melted Snow.												
	Annual Av.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 14 years, 1864–77	30.33	1.80	1.62	2.81	2.40	2.81	3.93	3.35	2.70	2.96	2.33	1.86	1.80
1877	37.40	1.33	0.00	5.58	4.14	2.23	3.53	2.25	6.57	1.38	5.69	3.67	1.03
1878	31.99	1.12	2.74	3.12	3.76	3.44	3.15	2.96	1.85	3.43	1.99	2.16	2.27
In 1878 Greater than Av. for 14 years, 1864–77	1.66	.....	1.12	.31	1.36	.63	.....	.....	.....	.47	.....	.30	.47
In 1878 Less than Av. for 14 years, 1864–77	.....	.68	.....	.....	.....	.....	.78	.39	.85	.....	.34	.....	.....
In 1878 Greater than in 1877	.....	.....	2.74	.....	.....	1.21	.....	.71	.....	2.05	.....	.....	1.24
In 1878 Less than in 1877	5.41	.21	.....	2.46	.38	.....	.38	.....	4.72	.....	3.70	1.51	.....

DIAGRAM No. V.—RAINFALL, BY MONTHS IN 1878.



* SCALE, one inch of rainfall to .72 of an inch, vertically.

Designed by Henry B. Baker.

Drawn by F. S. Kedzie.

TABLE VI.—*Inches of Rain and Melted Snow, for the Year and for each Month of the Year 1878, at 13 Stations in Michigan,—as compiled from Daily Observations made by Observers* for the State Board of Health, and for the U. S. Signal Service.*

PLACES OF OBSERVATION IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	INCHES OF RAIN AND MELTED SNOW.												
		YEAR 1878.	MONTHS, 1878.											
			Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average for 12 Localities.‡	.....	38.06	1.62	2.63	3.22	3.71	3.22	2.66	5.13	3.04	3.84	3.56	2.11	3.32
Petoskey*	N.†	§	.....	.....	0.81	2.28	3.21	5.48	1.48	0.95	3.72	3.92	0.30	2.00
Nirvana	W.	39.18	1.24	1.37	1.64	5.98	2.61	2.40	2.86	3.02	9.10	5.30	1.45	2.21
Agricultural College, near Lansing	C.	31.99	1.12	2.74	3.12	3.76	3.44	3.15	2.96	1.85	3.43	1.99	2.16	2.27
Otisville	C.	37.63	1.00	2.66	2.35	3.22	3.30	4.65	5.55	3.24	4.52	2.96	2.50	1.68
Thornville	B. & E.	35.24	1.83	3.13	4.18	2.16	1.94	4.22	5.80	1.46	3.21	1.66	2.92	2.73
Benton Harbor	S. W.	32.85	1.78	0.60	1.64	5.98	3.17	1.32	4.01	3.40	2.60	3.70	0.84	3.81
Niles	S. W.	38.06	0.71	1.29	2.19	5.67	4.27	1.56	6.49	4.80	1.64	5.82	1.12	2.50
Battle Creek	S. C.	25.40	0.19	3.85	1.32	0.68	0.94	2.31	2.90	2.10	4.00	3.50	0.16	3.45
Coldwater	S. C.	40.24	2.70	4.00	3.38	3.41	4.60	2.30	4.30	2.65	3.20	3.95	2.95	2.80
Kalamazoo	S. C.	45.82	2.19	2.81	5.14	5.76	4.13	1.78	5.30	4.15	2.23	4.47	2.13	5.73
Mendon	S. C.	36.87	1.25	1.46	3.90	3.69	4.04	3.49	4.09	2.67	3.42	3.17	2.71	2.98
Tecumseh	S. C.	39.89	0.98	4.23	4.41	2.87	3.82	2.39	4.51	3.77	4.22	2.29	2.93	3.47
Ypsilanti	S. C.	‖	0.19	3.55	2.07	.....	3.01	.....	6.05	1.63	4.23	1.68	2.91	3.43
Detroit	S. E.	43.39	3.04	2.58	3.34	2.06	2.77	3.36	8.76	2.92	3.74	2.89	3.10	4.83
Woodmere Cemetery, near Detroit	S. E.	42.21	2.47	3.59	5.10	3.02	3.10	2.19	7.04	2.35	4.19	3.00	2.53	3.63

* The Names of Observers, their Places of Observation, and the Counties in which these Places are situated, are given in Exhibit 9, page 337.
† The full names of the divisions and the counties in each division, are stated in Exhibit 1, page 153.
‡ This line is an average for only 12 of the stations from which statements were received for every month of the year; the records for the Agricultural College were received too late to be included in the average.
§ For ten months, 24.15 in. ‖ For ten months, 28.75 in.

The lines for seven representative localities included in Table VI. are graphically represented in Diagram V., opposite this page.

In regard to the great rainfall at Nirvana in September, 1878, stated in Table VI., and particularly noticeable on Diagram V., the following communication was received, in reply to an inquiry as to the accuracy of the report, from Lee S. Cobb, the observer at Nirvana:—

"The original and my copy of register for September, 1878, reads as follows, in regard to rainfall; viz.,—

DESCRIPTIONS OF LINES IN TABLE.	TOTAL RAINFALL.	DAY OF MONTH, TIME OF BEGINNING AND ENDING OF RAIN, AMOUNT OF RAINFALL, IN INCHES.											
Day of Month	.....	2	6	9	10	16	18	19	20	23	24	25	29
Time Beginning Rain	.....	6:30 P.M.	2:40 P.M.	6:30 P.M.	----	8 P.M.	10:30 P.M.	3 P.M.	----	Night.	Night.	----	6:30 P.M.
Time Ending Rain	.....	7 P.M.	3 P.M.	----	7 A.M.	8:30 P.M.	------	4 A.M.	7:30 P.M.	Night.	.....	6 P.M.	8 P.M.
Amount of Rainfall	9.10	.07	.03	----	.49	.03	------	1.07	2.51	.20	.....	4.40	.30

"There is no error in it *unless it be too small*, as my gauge was running over on two occasions when I visited it. There are some large stories about immense falls of water in this vicinity during that month, one by a man at Baldwin. He says that he 'set out a wooden pail at night and in the morning it was full,' and 'it could only catch such an amount as fell into it in an open lot.' I would say in regard to that shower that it was the 18th, and only 1.07 inches fell at my place, five miles

distant. But I was out in a *very* hard shower of about one hour's duration, and at my house, two and one-fourth miles south and one mile west, there was hardly enough to measure. The ground looked as it does after a heavy dew. One reliable story is told by V. E. Lacy, a business man of Nirvana. He says: 'At 6 A. M. on the 25th, I came from my barn and set my horse-pail (a common wooden one) on that stump [designating one about 100 feet from the house, and otherwise entirely in the open ground], and at 9 A. M. I went out and the water was just (3½) three and one-half inches deep in the pail. I calculated, by allowing for the flare of the pail, that at least three (3) inches of water had fallen in the three hours; and it had been raining some before 6 A. M., and rained some after 9 A. M.' He told me to tell you his experience. He is one of our most reliable men, and his experience is the same as my own on that occasion, as it fell fully three and one-half inches in three and one-half hours. I have seen instances here where a very few miles made the difference between an immense fall of water and scarce any at all. In the case I spoke of (I do not remember the date), I estimated the amount that fell where I was at not less than three-fourths of an inch, and two and one-half to three miles away it was scarce .01; and I am confident from what I myself saw, and from the reports of people in whom I have confidence, that even more than 9.10 inches of water fell in some parts of this county during the month of September, 1878. I had good opportunities to see and observe, as I was very busy at surveying just then."

OZONE.

By the day and night observations combined (Exhibit 24) the amount of atmospheric ozone in 1878 at the Agricultural College was slightly less than the average for the six preceding years; it was slightly greater than the average for the corresponding months of the same period in April, May, and June, and less in all other months. Comparing 1878 with 1877, ozone seems, by the same observations, to have been almost the same in the two years, though slightly less abundant in 1878 than in 1877, to have been more abundant in February, April, May, June, and December, 1878, and to have been less abundant in the other months of the year. In Exhibit 25, page 368, it is shown that the day ozone was slightly less abundant, and the night ozone slightly more abundant, at the College in 1878 than in 1877, and that both were less abundant than the average for the six preceding years. By the comparisons in Exhibits 26 and 27, page 367, of the average for 11 stations in 1878 with that for 10 stations in 1877 (seven of the stations being the same for each year), it would seem that ozone was much more abundant throughout the year, both by day and by night, in 1878 than in 1877. So great is the difference as to suggest the question whether there was a difference in the quality of the test-paper used. Arrangements have now been made to have the comparative sensitiveness of the test-paper to be used hereafter tested before its use.

During a series of years, it seems that exposure of the test-paper (Schönbein's) for seven hours (7 A. M. to 2 P. M.) during the day, results in nearly as great coloration as does its exposure for ten hours (9 P. M. to 7 A. M.) during the night; but in respect to this there is great difference in different months. During the cold months there is evidence of more ozone during the night than during the day observation, while during the warm months the reverse is true. It seems probable that the excess of night over day ozone in the cold months is not because of greater production of ozone during the night, but because of a lessened destruction of ozone at night, on account of less smoke and other organic material in the air capable of oxidation by ozone. In the warm months there is probably a lessened production of ozone at night, because of the absence of sunlight and comparative absence of wind, while there is sufficient filth in the night air in August to bring the ozone down to its least amount. Generally, more ozone is apparent in cold than in warm weather, but ozone seems to bear close relations to sunlight and wind, as well as to temperature, as may be seen by comparing Diagrams IV. and VIII. with Diagrams VI. and VII.

EXHIBIT 24.—*Comparison of the Average Amount of Atmospheric Ozone ("Day" and "Night" Observations Combined), as indicated by the Degree of Coloration* of Schönbein's Test-paper, during the Year and during each Month of the Year 1878, with the Averages for the 6 Years 1872-77, and for the Year 1877.—Test-paper exposed from 7 A. M. to 2 P. M. for the Day Observation, and from 9 P. M. to 7 A. M. for the Night Observation.—Observations made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

YEARS, ETC.	Ozone,—Degrees of Coloration.*—Day and Night Observations Combined.												
	Annual Av.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 6 years, 1872-77	4.01	5.53	5.49	5.49	4.43	3.88	2.89	2.34	2.25	2.56	3.79	4.55	4.94
1877	3.50	4.95	4.34	5.68	3.99	3.12	3.04	2.24	2.23	2.23	3.20	3.67	3.27
1878	3.47	4.11	5.17	4.81	4.45	4.04	3.09	1.92	1.92	1.92	2.34	3.16	4.65
In 1878 More than Av. for 6 years, 1872-77	.....	.....	.....	.....	.02	.16	.20	.....	.....	.....	.....	.....	.....
In 1878 Less than Av. for 6 years, 1872-77	.54	1.42	.32	.68	.....	.....	.....	.42	.33	.64	1.45	1.39	.29
In 1878 More than in 1877	.....	.....	.83	.....	.46	.92	.05	.....	.....	.....	.....	.....	1.38
In 1878 Less than in 1877	.03	.84	.....	.87	.....	.....	.....	.32	.31	.31	.86	.51	.....

* According to a scale of 10 degrees of coloration of Schönbein's test-paper. Maximum =10.

EXHIBIT 26.—*Comparison, by Year and Months, of the Average Day Ozone at 11 Stations in 1878 with the Average at 10 Stations in 1877.**

YEARS, ETC.	Ozone,—Degrees of Coloration.—Day Observation.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 10 Stations in 1877*	2.21	2.63	1.83	2.47	1.68	1.68	1.97	1.84	2.40	2.21	2.35	2.81	2.62
Av. for 11 Stations in 1878*	3.37	3.81	4.24	4.18	3.53	3.48	3.11	2.78	2.77	2.77	3.07	3.21	3.55
In 1878 Greater than in 1877	1.16	1.18	2.41	1.71	1.85	1.80	1.14	.94	.37	.56	.72	.40	.93

*Seven of the stations, namely, Nirvana, Thornville, Battle Creek, Coldwater, Kalamazoo, Mendon, and Tecumseh, were the same for both years; three, Fife Lake, Agricultural College (near Lansing), and Ypsilanti, were included in the average for 1877 but not in that for 1878; and four, Petoskey, Otisville, Niles, and Woodmere Cemetery (near Detroit), were included in the average for 1878 but not in that for 1877.

EXHIBIT 27.—*Comparison, by Year and Months, of the Average Night Ozone at 11 Stations in 1878 with the Average at 10 Stations in 1877.**

YEARS, ETC.	Ozone,—Degrees of Coloration.—Night Observation.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 10 Stations in 1877*	2.31	3.23	1.96	3.22	1.97	1.50	2.15	1.69	1.78	1.89	2.47	3.08	2.75
Av. for 11 Stations in 1878*	3.43	4.13	4.38	4.49	3.88	3.68	2.88	2.40	2.22	2.57	3.26	3.36	3.95
In 1878 Greater than in 1877	1.12	.90	2.42	1.27	1.91	2.18	.73	.71	.44	.68	.79	.28	1.20

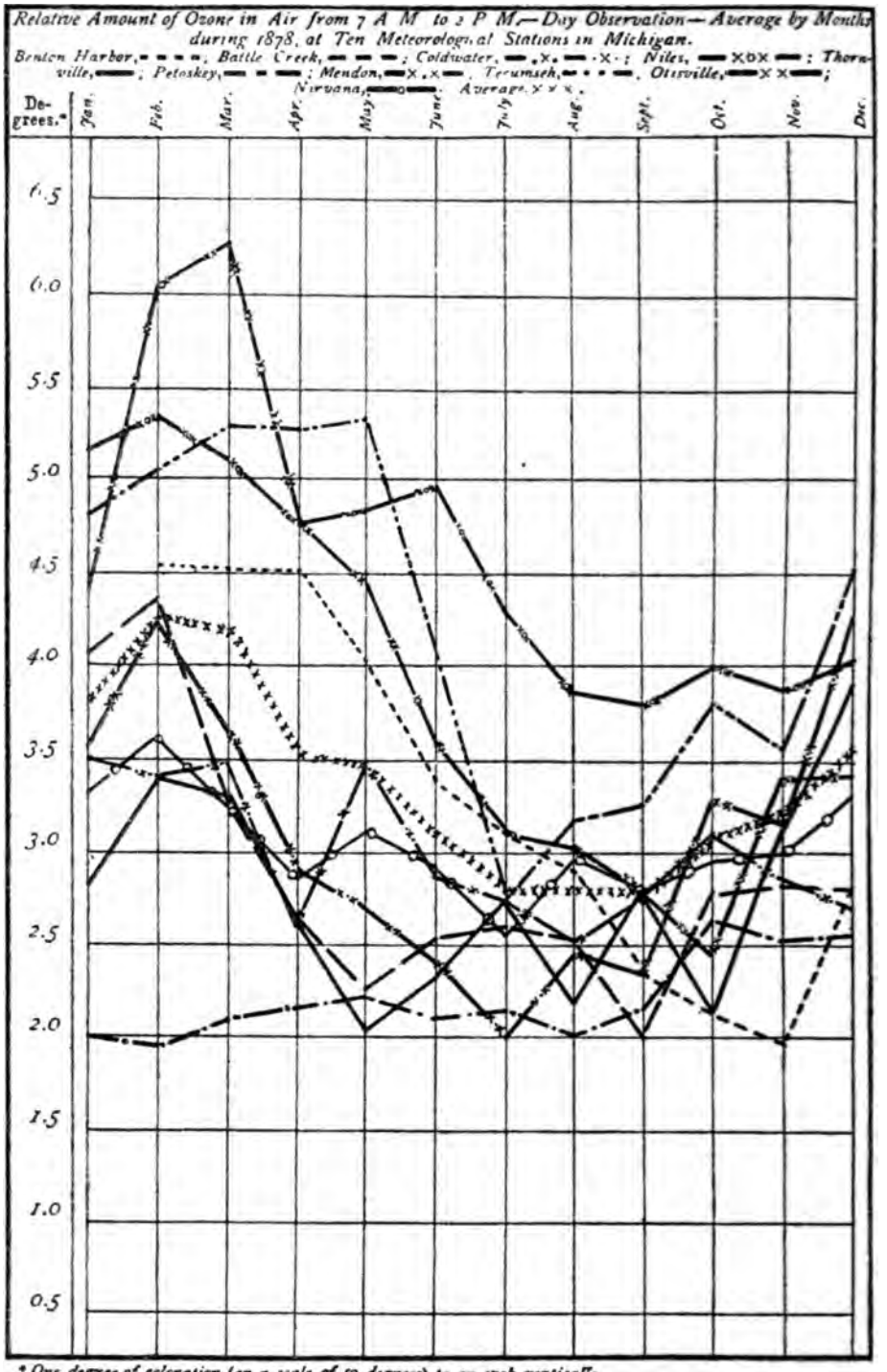
* For foot-note see same foot-note to Exhibit 26, above.

EXHIBIT 25.—*Comparison of the Average Amount of Atmospheric Ozone, as indicated by the Degree of Coloration* of Schönbein's Test-paper, during the Year and during each Month of the Year 1878, with the Average for the Six Years 1872-7, and with the Average for 1877; also Statement of the Average for each of the Six Years 1872-77,—Test-paper exposed from 7 A. M. to 2 P. M., for the Day Observation, and from 9 P. M. to 7 A. M., for the Night Observation.—Observations made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

MONTHS.	OZONE,—DEGREES OF COLORATION.*																			
	DAY OBSERVATION,—7 A. M. TO 2 P. M.*										NIGHT OBSERVATION,—9 P. M. TO 7 A. M.*									
	1872.	1873.	1874.	1875.	1876.	1877.	For 6 Years, 1872-7.	1878.	In 1878 More (+), or Less (-), than Av. for 6 Yrs. 1872-7.	In 1878 More (+), or Less (-), than in 1877.	1872.	1873.	1874.	1875.	1876.	1877.	For 6 Years, 1872-7.	1878.	In 1878 More (+), or Less (-), than Av. for 6 Yrs. 1872-7.	In 1878 More (+), or Less (-), than in 1877.
ANNUAL AVERAGE	2.82	4.02	4.10	4.53	3.68	3.66	3.80	3.50	-.30	-.16	4.24	4.72	3.99	5.04	4.11	3.33	4.24	3.42	-.86	+.10
January	4.50	5.06	5.10	5.52	5.32	4.87	5.06	3.74	-1.32	-1.13	5.44	6.32	6.39	5.93	6.90	5.03	6.09	4.48	-1.52	-.55
February	4.00	4.21	5.53	5.78	5.76	4.54	4.97	5.00	+.03	+.46	6.00	5.93	6.10	6.57	7.27	4.14	6.00	5.33	-.67	+1.19
March	3.00	4.09	5.00	5.70	6.06	5.29	4.86	4.68	-.18	-.61	5.71	5.80	6.00	6.19	7.00	6.06	6.13	4.94	-1.19	-1.12
April	2.63	3.76	5.70	3.73	3.70	3.70	3.87	4.37	+.50	+.67	5.30	4.27	6.60	3.96	5.53	4.27	4.99	4.53	-.46	+.26
May	2.14	4.58	5.80	3.19	3.10	3.29	3.68	3.97	+.29	+.68	3.84	5.59	4.90	4.03	4.13	2.94	4.24	4.10	-.14	+1.16
June	1.91	3.26	3.50	3.96	1.87	3.17	2.95	3.17	+.22	0	3.23	2.66	2.34	3.66	2.27	2.90	2.84	3.00	+.16	+.10
July	.88	3.59	1.80	3.52	2.16	2.71	2.44	2.10	-.34	-.61	2.28	3.06	1.50	3.22	1.58	1.77	2.24	1.74	-.50	-.03
August	.98	3.55	2.80	3.50	1.97	3.42	2.70	2.32	-.38	-1.10	.99	2.65	1.10	3.70	1.26	1.03	1.79	1.52	-.27	+.49
September	1.40	2.30	2.90	4.30	2.60	2.93	2.74	2.23	-.51	-.70	1.86	4.27	1.20	3.68	1.73	1.53	2.38	1.60	-.78	+.07
October	1.93	4.52	3.32	5.30	3.45	3.20	3.62	2.71	-.91	-.49	3.18	4.69	3.01	6.20	3.48	3.19	3.96	1.97	-1.99	-1.22
November	4.60	4.30	3.80	4.90	3.57	3.60	4.13	3.17	-.96	-.43	6.17	5.47	4.50	6.60	3.33	3.73	4.97	3.14	-1.83	-.59
December	5.81	4.97	4.00	5.00	4.57	3.17	4.59	4.55	-.04	+1.38	6.84	5.89	4.20	6.70	4.81	3.37	5.30	4.74	-.56	+1.37

* According to a scale of 10 degrees of coloration of Schönbein's test-paper, Maximum =10.

DIAGRAM No. VI.—OZONE, DAY, BY MONTHS IN 1878.



* One degree of coloration (on a scale of 10 degrees) to an inch vertically.

Drawn by F. S. Kedzie. Designed by Henry B. Baker.

TABLE VII.—*Relative Amount of Ozone in the Atmosphere, by Day during the Year and during each Month of the Year 1878, at 11 Stations in Michigan,—as Indicated by Averages of Observations made Daily by Exposing Test-paper, prepared according to Schönbein's formula, from 7 A. M. to 2 P. M.—Recorded, according to a scale of 10 Degrees of Coloration of the Test-paper (greatest coloration by ozone equals 10), by Observers for the State Board of Health.**

PLACES OF OBSERVATION IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	DEGREES OF COLORATION OF TEST-PAPER.—DAY OBSERVATIONS.												
		YEAR 1878.	MONTHS, 1878.											
			Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 11 localities‡	.....	3.37	3.81	4.24	4.18	3.53	3.48	3.11	2.78	2.77	2.77	3.07	3.21	3.55
Petoskey*	N.†	2.22	2.00	1.96	2.10	2.17	2.23	2.10	2.14	2.00	2.17	2.65	2.53	2.55
Nirvana	W.	3.06	3.31	3.61	3.26	2.87	3.11	2.93	2.56	2.95	2.80	2.95	3.00	3.31
Agricultural College, near Lansing	C.	3.50	3.74	5.00	4.68	4.37	3.97	3.17	2.10	2.32	2.23	2.71	3.17	4.55
Otisville	C.	3.98	4.42	6.04	5.29	4.77	4.45	3.60	3.10	3.03	2.80	2.45	3.41	3.43
Thornville	B. & E.	2.78	2.83	3.39	3.29	2.63	2.03	2.33	2.74	2.19	2.80	2.13	3.13	3.90
Benton Harbor	S. W.	..§..	....	4.54	4.52	4.52	4.03	3.41	3.11	2.92	2.34	2.14	1.97	2.83
Niles	S. W.	4.50	5.13	5.33	5.10	4.77	4.84	4.97	4.29	3.87	3.80	4.00	3.87	4.03
Battle Creek	S. C.	2.89	4.06	4.36	3.26	2.67	2.26	2.53	2.61	2.52	2.00	2.77	2.83	2.83
Coldwater	S. C.	3.01	3.50	3.43	3.48	2.60	3.48	2.87	2.74	2.52	2.77	3.10	2.87	2.71
Kalamazoo	S. C.	2.67	2.32	2.83	3.26	2.77	2.58	1.73	2.29	2.52	2.60	2.81	2.93	3.38
Mendon	S. C.	3.08	3.56	4.21	3.66	2.90	2.71	2.40	2.00	2.45	2.34	3.29	3.15	4.27
Tecumseh	S. C.	4.24	4.81	5.04	5.29	5.27	5.35	4.07	2.74	3.19	3.27	3.81	3.57	4.52
Ypsilanti	S. C.	..‖..	0.89	0.91	1.37	1.22	....	2.55	3.40	3.66	3.15	2.61	2.73	2.77
Woodmere Cemetery, near Detroit	S. E.	4.69	6.00	6.46	6.94	5.37	5.19	4.63	3.32	3.26	3.07	3.81	4.07	4.16

* The Names of Observers, their Places of Observation, and the Counties in which those Places are situated, are stated in Exhibit 9, page 337.
† The full names of the divisions and the counties in each division, are stated in Exhibit 1, page 153.
‡ This line is an average for only the stations for which statements are given for every month of the year, not including, however, the line for the Agricultural College, which was received too late to be included in the average.
§ For the 11 months, 3.30. ‖ For the 11 months, 2.30.

The "Average" line and the lines for ten representative localities included in Table VII., are graphically represented on Diagram VI., opposite this page.

INFLUENCE OF WIND AND OZONE ON CERTAIN DISEASES.

Diagrams Nos. VIII. and IX. are some of the valuable results of observations, in the office of the Board, by means of a self-registering anemoneter, which records the wind in miles per hour. The diagrams exhibit results for every month in 1878 except December, in which month the office was removed into the new State Capitol. By Diagram VIII. it will be seen that the velocity of the wind was not as great in February as in January, that it was greatest in March and April, and next greatest in October. while in July and August there was very little wind. It is interesting to compare this diagram with certain of the lines on Diagrams Nos. 1, 2, and 4, representing diseases which may be supposed to be more or less influenced by movements of the atmosphere. In a paragraph on a following page, some of the diseases which seem to be increased by absence of wind are commented upon; by turning to Diagrams 1, 2, and 4, in the article on Weekly Reports of Diseases, it may be seen that bronchitis, pneumonia, influenza, diphtheria, rheumatism, and consumption seem

to have prevailed most in those months when the Diagrams VII. and VIII., in this article, show that the wind and ozone were abundant. It is worthy of notice that, excepting rheumatism, which wind and cold influence unfavorably, these are all diseases of the air passages, or of the lungs; though diphtheria is most frequently manifest in the throat, it is in that part of the throat over which the air passes. Unless we except consumption and rheumatism, they are all inflammatory diseases. It seems reasonable that the abundance of ozone and the velocity of the wind may have influence in causing irritation of the air-passages, which if sufficiently powerful and long-continued should tend toward influenza, bronchitis, and pneumonia, and toward inflammation of lungs already the seat of consumption. It also seems reasonable to expect that a communicable disease like diphtheria would most easily be contracted when infectious particles in the air taken into the throat find lodgment on a surface already made raw or inflamed by the irritating action of excessive ozone or wind.

TABLE VIII.—*Relative Amount of Ozone in the Atmosphere by Night, during the Year and during each Month of the Year 1878, at 11 Stations in Michigan,—as indicated by Averages of Observations made Daily by exposing Test-paper, prepared according to Shönbein's formula, from 9 P. M. to 7 A. M.—Recorded, according to a Scale of 10 Degrees of Coloration of the Test-paper (greatest coloration by ozone equals 10), by Observers for the State Board of Health.**

PLACES OF OBSERVATION IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	DEGREES OF COLORATION OF TEST-PAPER.—NIGHT OBSERVATIONS.												
		YEAR 1878.	MONTHS, 1878.											
			Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 11 localities.‡	.....	3.43	4.13	4.38	4.49	3.88	3.68	2.88	2.40	2.22	2.57	3.26	3.36	3.95
Petoskey*	N.†	2.11	2.00	1.82	1.94	2.20	2.00	2.03	1.89	2.00	2.07	2.32	2.53	2.55
Nirvana	W.	2.57	3.44	3.64	3.56	2.83	2.95	2.23	1.23	1.06	1.70	2.46	2.30	3.44
Agricultural College, near Lansing	C.	3.42	4.48	5.33	4.94	4.53	4.10	3.00	1.74	1.52	1.60	1.97	3.14	4.74
Otisville	C.	4.40	4.90	5.89	7.06	6.03	5.39	3.57	3.21	2.43	2.86	3.20	4.07	4.23
Thornville	B. & E.	3.09	2.81	3.48	3.87	3.10	2.41	2.48	2.74	2.46	2.97	2.94	3.30	4.48
Benton Harbor	S. W.	..§..	.....	4.68	5.65	5.29	5.10	3.90	2.82	3.08	2.07	2.73	2.47	3.20
Niles	S. W.	4.18	5.65	4.96	5.23	4.53	4.71	4.03	3.00	2.76	3.17	3.68	3.67	4.77
Battle Creek	S. C.	3.00	4.23	5.11	3.58	3.07	2.26	2.23	2.35	2.23	1.88	2.82	2.98	3.29
Coldwater	S. C.	3.61	4.33	4.32	4.32	3.47	3.94	3.40	3.45	3.19	3.10	3.74	3.60	2.45
Kalamazoo	S. C.	3.17	2.77	3.13	3.71	3.47	3.23	2.23	2.32	2.45	2.90	3.87	3.63	4.31
Mendon	S. C.	3.21	3.88	4.74	4.54	3.28	3.39	2.27	1.62	1.50	2.21	3.32	3.32	4.40
Tecumseh	S. C.	3.95	5.16	4.89	5.45	5.17	4.97	3.17	1.94	2.13	2.67	3.55	3.67	4.68
Ypsilanti	S. C.	..‖..	1.03	1.30	1.55	1.45	.....	2.88	1.68	1.87	1.56	1.89	2.67	2.97
Woodmere Cemetery, near Detroit	S. E.	4.47	6.23	6.25	6.13	5.53	5.19	4.07	2.61	2.23	2.73	3.94	3.89	4.84

* The Names of Observers, their Places of Observation, and the Counties in which these Places are situated, are stated in Exhibit 9, page 337.

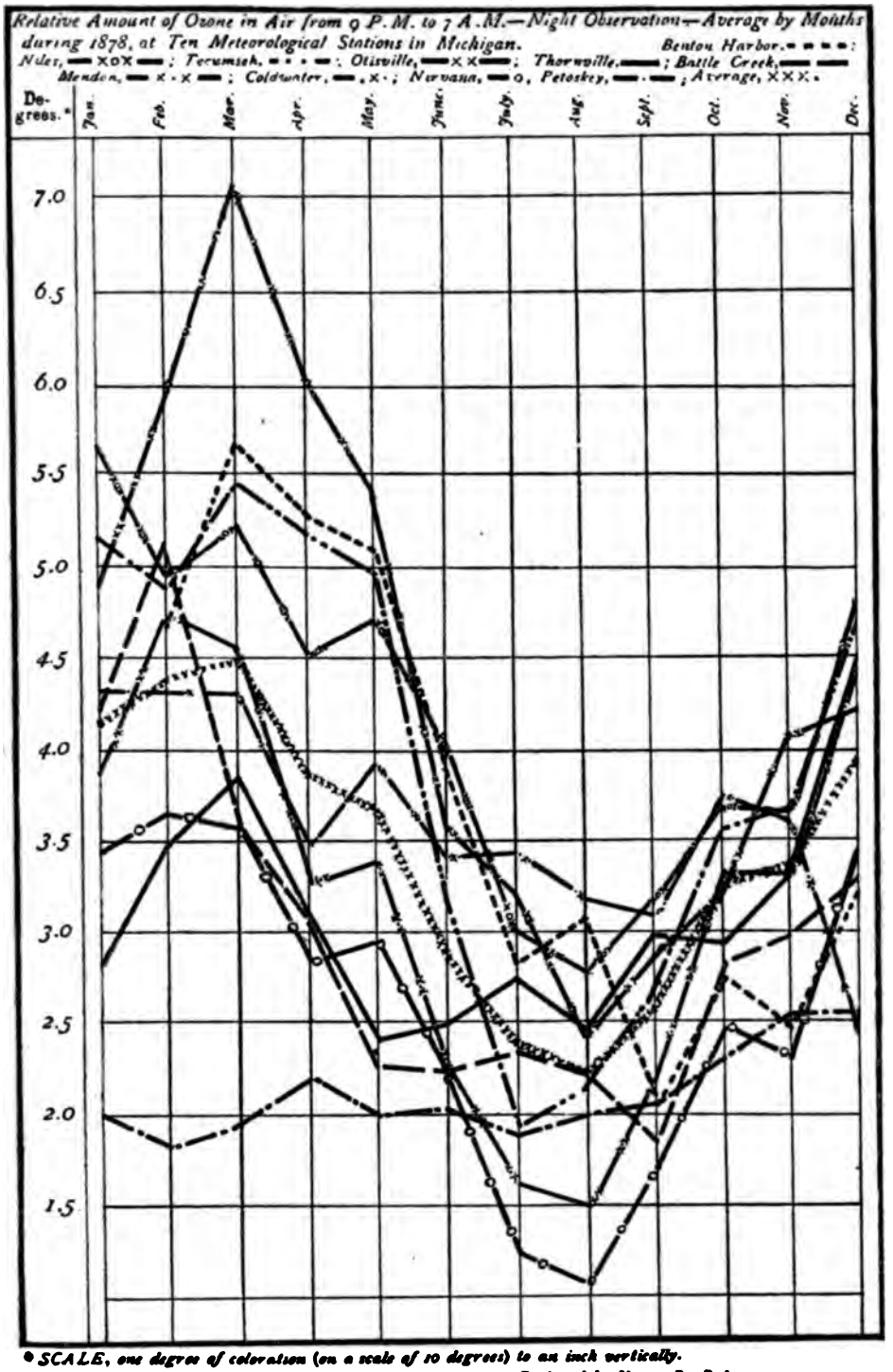
† The full names of the divisions and the counties in each division, are stated in Exhibit 1, page 153.

‡ This line is an average for only the stations for which statements are given for every month of the year, not, however, including the line for the Agricultural College, which was received too late to be included in the average.

§ For 11 months, 3.73. ‖ For 11 months, 1.90.

The "Average" line, and the lines for ten representative localities included in this table are graphically represented in Diagram VII., opposite this page.

DIAGRAM No. VII.—OZONE, NIGHT, BY MONTHS IN 1878.



* SCALE, one degree of coloration (on a scale of 10 degrees) to an inch vertically.

Drawn by F. S. Kedzie. Designed by Henry B. Baker.

DIAGRAM No. VIII—VELOCITY OF THE WIND, BY MONTHS IN 1878.

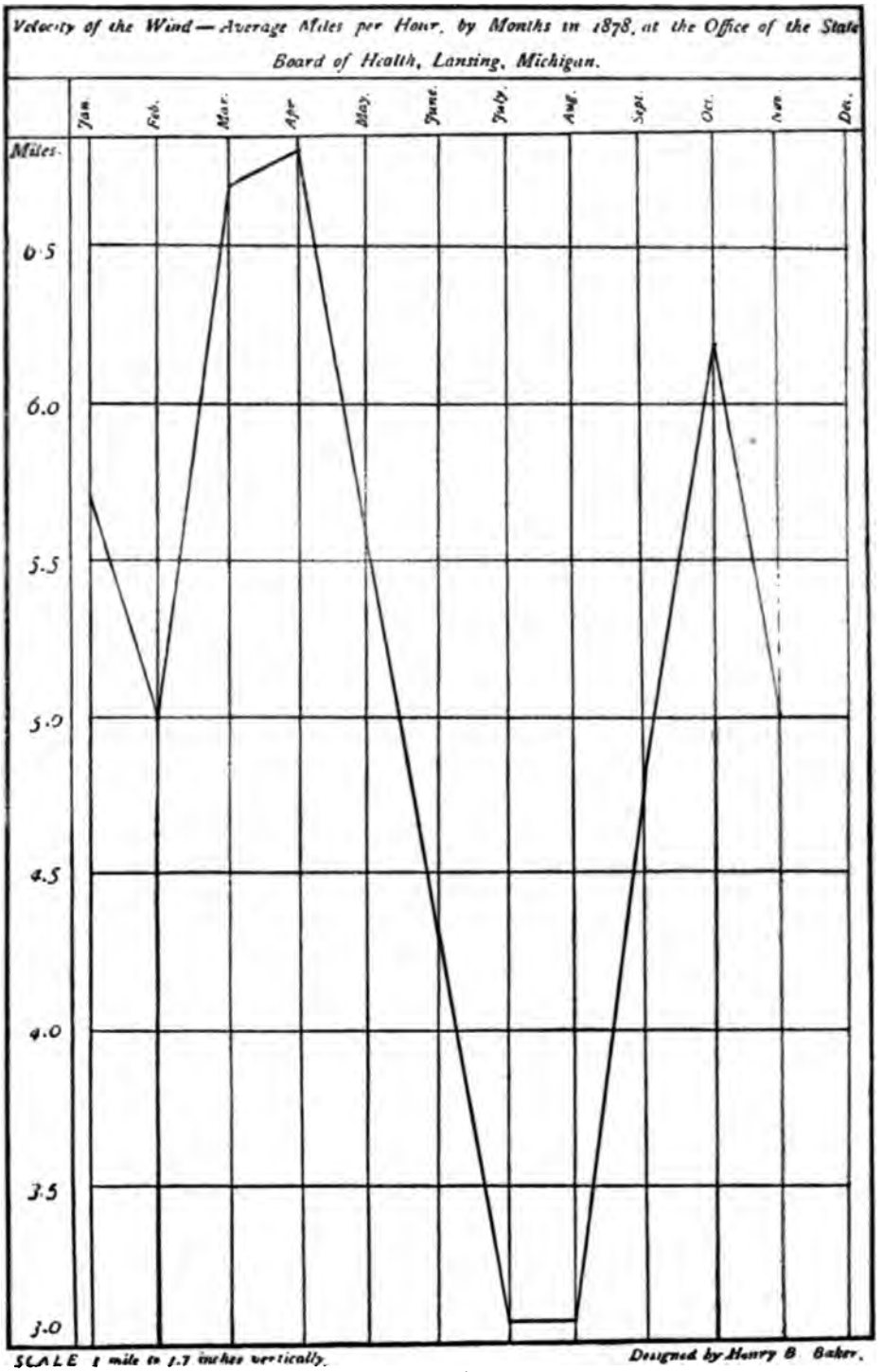
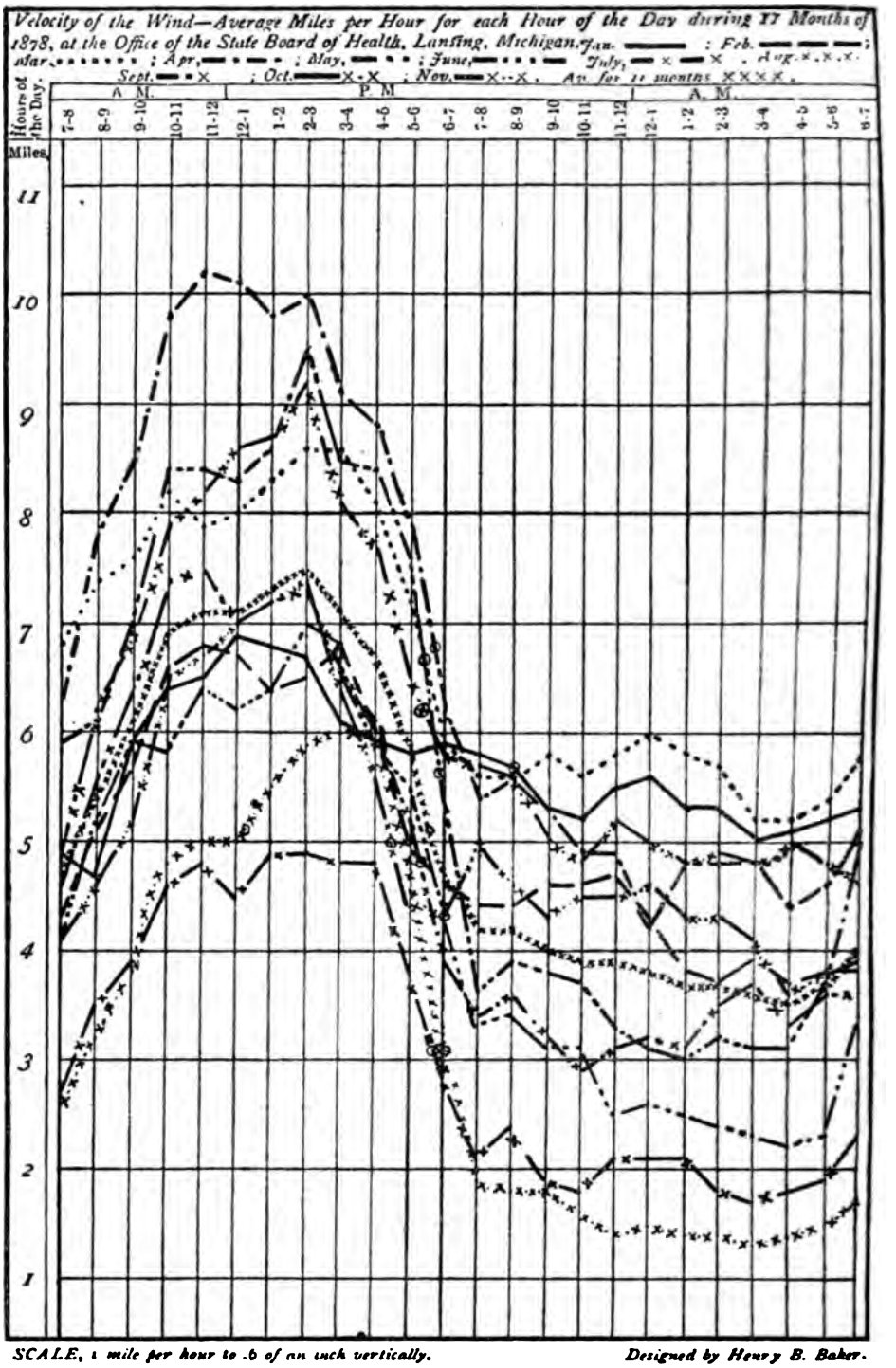


DIAGRAM No. IX.—VELOCITY OF THE WIND AT EACH HOUR, 1878.



SCALE, 1 mile per hour to .6 of an inch vertically. *Designed by Henry B. Baker.*

Drawn by H. B. Turner.

The average velocity per month and for the 12 months is indicated by the position of the circle o on the line for each month or for the 12 months.

TABLE IX.—*Average Velocity of the Wind in Miles, per Hour, during each Hour of the Day, by Months, for Eleven Months of the Year 1878.—Compiled from Registers of the Robinson's Self-Registering Anemometer in the Office of the State Board of Health, Lansing, Michigan.*

MONTHS.—1878.	HOURS, AND MILES PER HOUR.																								
		A. M.					P. M.												A. M.						
	AVERAGE.	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7
AV., 11 MONTHS	5.1	4.7	5.4	6.1	6.9	7.1	7.1	7.3	7.5	7.1	6.7	5.8	4.7	4.2	4.2	4.0	3.9	3.9	3.8	3.7	3.7	3.6	3.5	3.7	4.0
January	5.7	4.9	4.7	5.9	6.4	6.5	6.9	6.8	6.7	6.1	5.9	5.8	5.9	5.8	5.7	5.3	5.2	5.5	5.6	5.3	5.3	5.0	5.1	5.2	5.3
February	5.0	4.3	5.1	5.7	6.6	6.8	6.7	6.4	6.5	6.8	6.1	4.9	4.6	4.4	4.4	4.6	4.6	4.7	4.3	3.8	3.7	3.9	3.7	3.8	3.8
March	6.7	6.8	7.4	7.6	8.2	7.9	8.0	8.3	8.6	8.6	8.1	7.2	5.9	5.6	5.6	5.8	5.6	5.8	6.0	5.8	5.7	5.2	5.2	4.4	5.8
April	6.8	6.3	7.8	8.5	9.8	10.2	10.1	9.8	10.0	9.1	8.8	7.9	6.2	5.4	5.6	5.3	4.9	4.9	4.2	4.8	4.8	4.8	4.4	4.6	5.1
May	5.6	5.9	6.1	7.0	8.4	8.4	8.3	8.6	9.5	8.5	8.4	7.6	5.4	3.6	3.9	3.8	3.7	3.3	3.1	3.0	3.2	3.1	3.1	3.7	5.0
June	4.3	4.1	5.2	5.9	5.8	6.4	6.2	6.4	7.0	6.8	5.9	5.5	4.3	3.3	3.4	3.1	3.1	2.5	2.6	2.5	2.4	2.3	2.2	2.3	3.3
July[a]	3.1	2.7	3.5	3.9	4.6	4.8	4.5	4.9	4.9	4.8	4.8	3.8	2.8	2.1	2.4	1.9	1.8	2.1	2.1	2.1	1.8	1.7	1.7	1.9	2.3
August[b]	3.1	2.6	3.2	3.8	4.8	5.0	5.0	5.5	5.9	6.0	6.0	4.7	2.9	1.9	1.8	1.8	1.6	1.4	1.5	1.4	1.4	1.3	1.4	1.5	1.7
September[c]	4.8	4.6	5.6	6.4	7.4	7.5	7.0	7.2	7.3	6.6	6.0	5.2	3.9	3.4	3.6	3.2	2.9	3.1	3.2	3.1	3.5	3.7	3.3	3.6	3.6
October	6.2	4.9	6.2	6.9	7.9	8.2	8.6	8.7	9.2	8.1	7.7	6.5	5.8	5.7	5.6	5.0	4.8	5.2	5.0	4.8	4.9	4.8	5.0	4.8	4.6
November	5.0	4.1	4.6	5.2	6.5	6.7	7.0	7.2	7.4	6.4	5.6	4.4	4.3	5.0	4.6	4.3	4.5	4.5	4.6	4.3	4.3	4.1	3.6	3.8	3.9

[a] For only about 20 days. [b] For only about 27 days. [c] For only about 24 days.

The statements in the first figure-column in Table IX., of the average velocity of the wind in miles per hour are graphically represented, for eleven months of the year 1878, in Diagram VIII., page 375. The remaining columns of Table IX. are graphically represented in Diagram IX., page 378.

By Diagram IX. it may be seen that, during the day time, the wind was highest in the month of April, while from nine o'clock at night to seven in the morning the March wind was highest, averaging between five and six miles per hour; the lowest average velocity of day wind was in July, the lowest of night wind in August. The line for average for the eleven months shows that, generally, the wind rose from five o'clock in the morning until three in the afternoon, fell rapidly until eight in the evening and slightly during the night.

TABLE X.—*Number of Observations per Month, at which the Wind was Blowing from each of the Eight Principal Points of Compass, during the Year and during each Month of the Year 1878,—Average for 12 Stations in Michigan.**

POINTS OF COMPASS.	AVERAGE NUMBER OF OBSERVATIONS PER MONTH, 1878.												
	Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All Observations.	90	92	84	90	89	93	90	92	92	89	92	88	92
Calms	4	3	4	2	2	4	5	8	8	7	3	3	1
North	7	7	9	8	7	6	7	11	7	6	5	8	2
North-east	8	9	16	8	11	8	8	10	7	5	2	7	6
East	6	7	5	10	10	7	6	7	4	2	2	7	6
South-east	8	7	5	9	11	11	11	8	5	14	8	5	4
South	9	14	9	9	8	6	11	10	7	13	15	5	5
South-west	18	17	13	14	13	17	16	15	23	19	24	15	30
West	16	14	10	15	14	19	13	11	17	13	20	19	26
North-west	14	14	12	17	12	16	13	12	14	11	14	19	12

* The Names of Observers, their Places of Observation, and the Counties in which these places are situated, are stated in Exhibit 9, page 337.

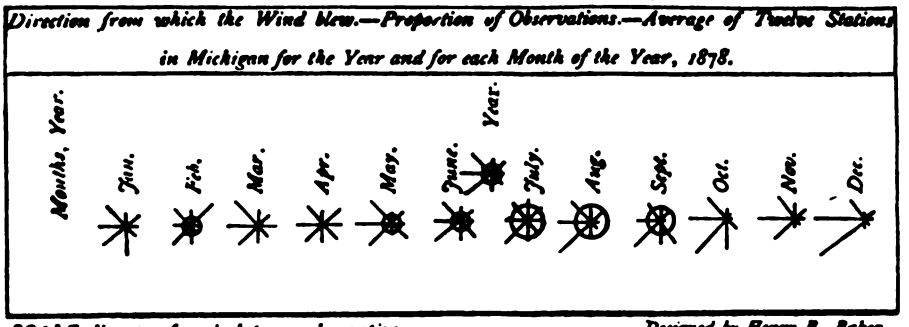
Graphic representations of statements in Tables X. and XI. are given in Diagrams X. and XI., opposite this page.

TABLE XI.—*Average Number of Observations per Month, for the Year 1878, at which the Wind was Blowing from each of the Eight Principal Points of Compass, at each of 12 Stations in Michigan; also the Average for All said Stations.**

STATIONS IN MICHIGAN.*	AVERAGE NUMBER OF OBSERVATIONS PER MONTH, IN 1878.									
	All Obs.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.
AV., 12 STATIONS	90	4	7	8	6	8	9	18	16	14
Nirvana *	91	3	4	17	6	11	2	31	5	14
Otisville	90	0	7	9	5	16	7	15	12	20
Thornville	91	14	4	12	2	13	3	19	6	18
Benton Harbor	88	20	4	4	9	7	9	12	13	11
Niles	91	0	1	2	6	14	5	20	33	11
Battle Creek	91	0	5	10	6	9	11	18	16	16
Coldwater	91	0	13	1	4	4	17	14	26	11
Kalamazoo	91	0	7	8	3	8	11	28	9	18
Mendon	86	0	8	7	8	4	17	13	19	10
Tecumseh	91	9	11	6	9	7	8	15	16	10
Detroit	91	5	7	12	9	3	7	21	16	11
Woodmere Cemetery	91	1	12	8	8	2	15	12	20	13

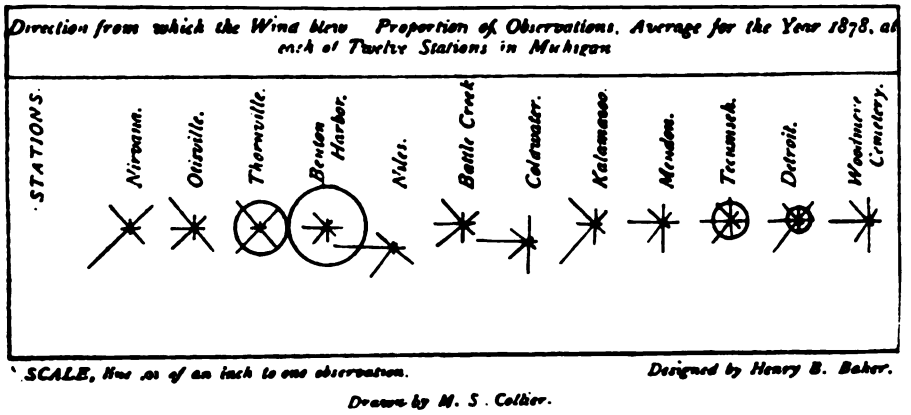
* The Names of Observers, their Places of Observation, and the Counties in which these places are situated are stated in Exhibit 9, page 337.

DIAGRAM No. X.—DIRECTION OF WIND IN MICHIGAN, BY MONTHS IN 1878.



Explanations of Diagrams X., XI., and XII. are given on page 340.

DIAGRAM No. XI.—DIRECTION OF WIND AT STATIONS IN MICHIGAN, 1878.



By the figures for the year 1878 in Diagram X., it will be seen that at the 12 stations averaged the prevailing winds were from the south-west, west, and north-west. By the other figures of this diagram it seems that south winds were most common in January and October, frequent in February, March, April, June, July, August, and September; that east winds were most common in March and April; and that north-east winds were most common in February, April, and July. It will be remembered that May and June were unusually cold months.

By Diagram X. it appears that calms were most frequent in July and August, quite frequent in September, June, May, and February. By Diagram VIII., page 375, it appears that by the registering anemometer in the office of the State Board of Health at Lansing, the velocity of the wind, in miles per hour, was least in July and August, small in September, June, May, and February, the same months in which, by Diagram X., calms were frequent throughout the State. In Tables X. and XI., page 380, are given definite numerical equivalents of lines in Diagrams X. and XI.

By Diagram XI., calms seem to have been most frequent at Benton Harbor, and quite frequent at Thornville and Tecumseh. It would be interesting to know how much of the difference in statements in regard to calms is due to peculiarities of individual observers.

TABLE XII.—*Number of Observations, for each Month of the Year 1878, at which the Wind was Blowing from each of the Eight Principal Points of Compass, at each of 14 Stations* in Michigan; also the Average for the 12 of said Stations from which nearly Complete Observations were received for the Year. (Observations made at 7 A. M., 2 P. M., and 9 P. M., Daily.)*

STATIONS IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	NUMBER OF OBSERVATIONS AT WHICH THE WIND WAS BLOWING FROM DIRECTIONS NAMED.																											
		JANUARY.										FEBRUARY.										MARCH.									
		Total.	Calm.	N.	N. E.	E.	S.E.	S.	S. W.	W.	N.W.	Total.	Calm.	N.	N. E.	E.	S.E.	S.	S. W.	W.	N.W.	Total.	Calm.	N.	N. E.	E.	S.E.	S.	S.W.	W.	N.W.
Average for 12 Localities‡ ..	------	92	3	7	9	7	7	14	17	14	14	84	4	9	16	5	5	9	13	10	12	90	2	8	8	10	9	9	14	15	17
Petoskey*.....	N.†	43	3	2	7	1	8	2	11	1	13	84	13	11	10	1	12	4	18	1	14	93	11	0	3	10	22	0	17	11	19
Nirvana.....	W.	93	2	7	27	3	6	4	22	8	14	84	4	6	32	4	6	1	14	1	16	93	0	7	18	5	15	5	23	4	16
Otisville	C.	93	0	5	9	8	19	15	6	9	22	84	0	6	16	7	11	11	9	9	15	93	0	10	7	13	19	1	15	11	17
Thornville.....	B. & E.	93	16	3	8	0	16	3	20	1	26	84	17	0	25	0	11	2	15	1	13	93	6	3	10	0	14	3	18	1	33
Benton Harbor..	S. W.	88	15	1	0	17	7	18	7	10	13	83	25	4	9	15	6	7	13	1	3	93	19	6	7	8	5	18	8	13	9
Niles.....	S. W.	93	0	4	1	8	5	16	19	26	14	84	0	1	8	9	7	4	25	15	15	90	0	2	5	5	8	4	22	28	16
Battle Creek	S. C.	93	0	8	15	9	0	26	17	11	7	84	1	7	20	6	3	17	6	14	10	93	0	4	10	7	15	6	12	23	16
Coldwater.....	S. C.	93	0	9	0	2	3	7	27	25	20	84	0	22	0	0	1	6	19	27	9	93	0	13	3	3	3	16	8	32	15
Kalamazoo.....	S. C.	93	0	9	14	3	7	11	29	7	13	84	0	14	13	1	5	12	15	10	14	93	0	3	9	3	11	11	24	9	23
Mendon.....	S. C.	89	0	10	11	6	3	16	25	7	11	80	1	9	19	7	4	16	1	17	6	85	0	11	4	11	5	15	9	22	8
Tecumseh	S. C.	93	3	3	4	13	13	16	12	21	8	84	2	14	13	4	6	9	9	9	18	93	4	15	3	26	8	6	3	12	16
Ypsilanti	S. C.	93	0	2	12	5	21	5	19	17	12	84	0	8	24	2	11	9	14	10	6	93	0	3	11	6	18	3	18	9	25
Detroit.....	S. E.	93	1	12	11	7	2	20	12	24	4	84	0	7	23	5	3	5	22	9	10	93	0	10	14	16	2	5	23	9	14
Woodmere Com.	S. E.	93	0	16	6	8	2	15	11	23	12	84	0	18	13	2	2	18	12	7	12	93	0	7	9	18	2	16	5	19	17

* The Names of Observers, their Places of Observation, and the Counties in which these Places are situated, are stated in Exhibit 9, page 337.
† The full names of the divisions and the counties in each division are stated in Exhibit 1, page 153.
‡ This line is an average for only the 12 stations from which statements nearly complete were received for every month of the year; it does not include the lines for Petoskey and Ypsilanti.

Graphic representations of statements in this table are given in Diagram XII., page 387, which is explained on page 340.

TABLE XII.—CONTINUED.—*Direction of the Wind, Months in 1878.—Number of Observations at which the Wind was Blowing from Directions Named.*

STATIONS IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	NUMBER OF OBSERVATIONS AT WHICH THE WIND WAS BLOWING FROM DIRECTIONS NAMED.																													
		APRIL.										MAY.										JUNE.									
		Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W	N. W.
Average for 12 Localities‡..	.....	89	2	7	11	10	11	8	13	14	12	93	4	6	8	7	11	6	17	19	16	90	5	7	8	6	11	11	16	13	13
Petoskey*.....	N.†	90	17	0	5	16	4	0	21	19	8	93	10	0	0	1	12	0	8	49	13	90	9	1	0	4	3	0	16	46	11
Nirvana.....	W.	90	1	2	23	7	20	4	21	2	10	93	0	1	17	1	12	3	45	1	13	90	1	5	10	3	13	0	47	0	11
Otisville.....	C.	90	0	7	12	7	19	6	9	8	22	93	0	6	12	5	16	9	14	9	22	90	0	1	12	2	27	0	17	9	22
Thornville.....	B. & E.	90	2	0	21	8	17	0	14	5	23	93	14	8	11	3	16	4	17	4	16	90	14	2	19	3	12	2	13	6	19
Benton Harbor..	S. W.	87	23	9	4	2	10	10	10	15	4	93	20	3	3	7	11	8	13	20	8	90	25	6	4	13	9	3	7	11	12
Niles.....	S. W.	90	0	2	5	15	5	7	12	32	12	93	0	1	1	6	23	1	13	30	18	90	0	0	0	0	16	6	17	44	7
Battle Creek.....	S. C.	90	0	5	12	13	12	10	11	15	12	93	0	3	4	4	14	5	17	23	23	90	0	6	7	8	13	14	18	8	16
Coldwater.....	S. C.	90	0	14	2	8	6	13	11	25	11	93	0	7	0	4	3	9	14	31	25	90	0	18	0	6	6	19	8	25	8
Kalamazoo.....	S. C.	90	0	9	9	8	12	4	27	7	14	93	0	4	6	3	14	4	32	12	18	90	0	11	7	3	11	13	20	3	22
Mendon.....	S. C.	88	0	11	6	15	3	10	10	18	10	89	0	8	5	12	5	13	3	30	13	88	0	5	5	10	7	27	5	20	9
Tecumseh.....	S. C.	90	3	11	8	17	15	4	11	9	12	93	15	12	9	6	9	3	10	20	9	90	17	11	7	5	4	17	8	16	5
Ypsilanti.....	S. C.	0	.....	..	.....	..	.....	..	.....	...	.....	93	0	1	12	5	13	1	24	18	19	80	0	4	10	8	11	10	20	11	6
Detroit.....	S. E.	90	0	5	21	10	8	6	18	13	9	93	0	3	12	19	5	3	15	24	12	90	2	7	14	15	4	8	19	10	11
Woodmere Cem.	S. E.	90	0	9	12	13	3	21	6	20	6	93	1	11	11	9	3	11	9	23	15	90	0	14	11	9	4	24	7	9	12

* The Names of Observers, their Places of Observation, and the Counties in which these Places are situated, are stated in Exhibit 9, page 337.
† The full names of the divisions and the counties in each division are stated in Exhibit 1, page 153.
‡ This line is an average for only the 12 stations from which statements nearly complete were received for every month of the year; it does not include the lines for Petoskey and Ypsilanti.

Graphic representations of statements in this table are given in Diagram XII., page 387, which is explained on page 340.

TABLE XII.—CONTINUED.—*Direction of the Wind, Months in 1878.—Number of Observations at which the Wind was Blowing from Directions Named.*

STATIONS IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	NUMBER OF OBSERVATIONS AT WHICH THE WIND WAS BLOWING FROM DIRECTIONS NAMED.																												
		JULY.										AUGUST.										SEPTEMBER.								
		Total.	Calm.	N.	N. E.	E.	S.E.	S.	S.W.	W.	N.W.	Total.	Calm.	N.	N. E.	E.	S.E.	S.	S.W.	W.	N.W.	Total.	Calm.	N.	N. E.	E.	S.E.	S.	S.W.	W.	N.W.
Average for 12 Localities‡	------	92	8	11	10	7	8	10	15	11	12	92	8	7	7	4	5	7	23	17	14	89	7	6	5	2	14	13	19	13	11
Petoskey *	N.†	84	5	0	8	1	5	5	13	33	14	87	20	1	0	2	13	1	14	27	9	90	14	0	3	0	10	1	25	30	7
Nirvana	W.	93	4	0	12	10	17	0	36	3	11	93	2	1	17	4	10	2	40	8	9	90	8	3	8	4	16	0	38	0	13
Otisville	C.	93	0	10	12	2	11	10	15	6	27	93	0	9	3		14	3	22	6	29	88	0	7	7	2	28	7	13	9	15
Thornville	B. & E.	93	34	7	10	2	7	4	10	3	16	93	25	2	12		7	0	34	0	10	90	15	6	6	0	25	8	5	9	16
Benton Harbor	S. W.	87	27	5	5	6	8	1	10	9	16	89	28	5	1	6	3	2	17	9	18	83	21	2	6	2	7	5	17	11	12
Niles	S. W.	93	0	0	0	10	25	4	25	24	5	93	0	0	2	3	12	4	15	54	3	90	0	0	0	0	27	5	22	32	4
Battle Creek	S. C.	93	0	9	18	8	10	5	13	18	12	93	0	9	9		2	13	13	21	25	90	0	5	4	2	16	10	22	13	18
Coldwater	S. C.	93	0	8	0	5	3	34	11	26	5	93	0	18	0	3	2	21	6	32	11	90	0	15	0	2	3	32	10	23	5
Kalamazoo	S. C.	93	0	17	18	0	6	16	15	4	17	93	0	6	4	4	1	5	45	6	21	90	0	0	4	0	18	18	23	9	18
Mendon	S. C.	89	0	22	9	9	2	21	6	12	8	86	0	9	8		0	19	19	19	7	83	0	3	6	2	10	21	14	14	13
Tecumseh	S. C.	93	18	25	3	9	5	4	12	8	9	93	15	12	4	4	7	5	20	19	7	90	18	12	8	3	3	15	17	12	2
Ypsilanti	S. C.	93	1	15	14	10	3	7	21	17	5	93	0	6	18	6	3	4	27	22	7	78	0	0	13	2	3	19	17	13	11
Detroit	S. E.	93	12	9	19	14	2	4	19	4	10	93	26	7	11	3	0	2	23	13	8	90	15	7	5	4	11	7	22	10	9
Woodmere Cem.	S. E.	93	0	14	10	10	5	18	13	10	13	93	4	9	8	8	1	13	20	16	14	90	1	13	6	3	3	24	17	16	7

* The Names of Observers, their Places of Observation, and the Counties in which these Places are situated, are stated in Exhibit 9, page 337.
† The full names of the divisions and the counties in each division are stated in Exhibit 1, page 153.
‡ This line is an average for only the 12 stations from which statements nearly complete were received for every month of the year; it does not include the lines for Petoskey and Ypsilanti.

Graphic representations of statements in this table are given in Diagram XII., page 387, which is explained on page 340.

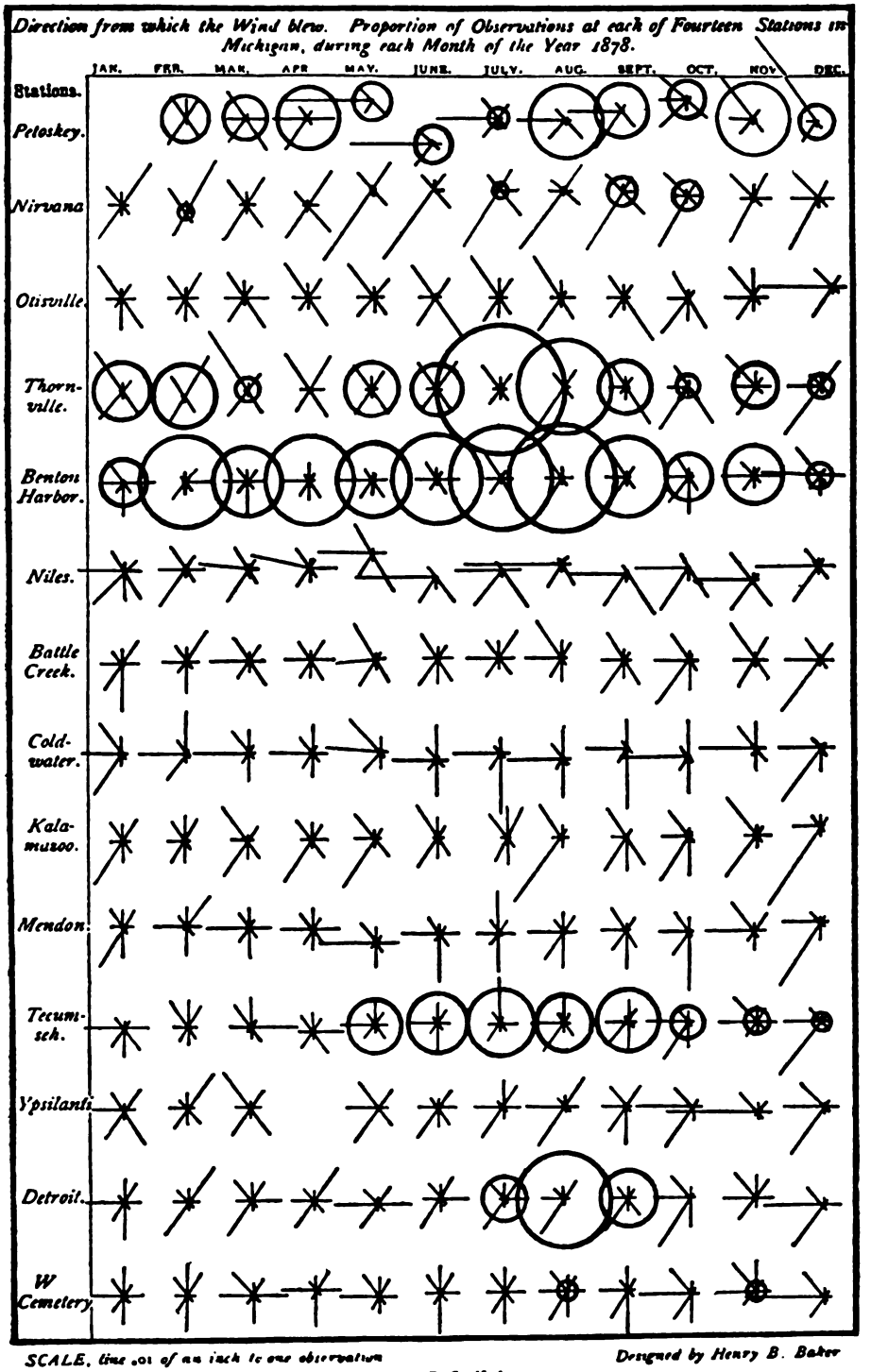
TABLE XII.—CONTINUED.—*Direction of the Wind, Months in 1878.—Number of Observations at which the Wind was Blowing from Directions Named.*

STATIONS IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	NUMBER OF OBSERVATIONS AT WHICH THE WIND WAS BLOWING FROM DIRECTIONS NAMED.																													
		OCTOBER.										NOVEMBER.										DECEMBER.									
		Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Total.	Calm	N.	N. E.	E.	S. E	S.	S. W.	W.	N. W.
Average for 12 Localities‡	.....	92	3	5	2	2	8	15	24	20	14	88	3	8	7	7	5	5	15	19	19	92	1	2	6	6	4	5	30	26	12
Petoskey*	N.†	93	10	2	1	1	15	5	22	16	21	90	20	1	4	1	8	2	11	13	30	93	9	0	0	1	3	2	14	6	58
Nirvana	W.	93	7	3	9	7	9	1	31	7	19	90	0	7	15	9	5	1	27	7	19	93	1	0	10	9	6	3	32	14	18
Otisville	C.	89	0	4	2	0	18	13	24	11	17	85	0	14	5	5	4	6	15	16	20	93	0	1	6	7	4	3	20	39	13
Thornville	B. & E.	93	5	3	1	1	24	6	28	12	13	90	12	8	3	8	4	2	18	12	23	93	6	4	17	0	4	3	33	18	8
Benton Harbor	S. W.	89	11	4	2	2	9	20	18	12	11	89	18	3	4	14	4	7	10	18	11	90	5	1	2	12	3	10	8	31	18
Niles	S. W.	93	0	0	0	0	20	6	28	30	9	90	0	1	2	1	16	0	21	30	19	93	0	2	3	9	6	2	24	35	12
Battle Creek	S. C.	93	0	2	1	2	6	17	29	19	17	90	0	1	13	4	13	3	18	12	25	93	0	1	9	8	3	2	36	20	14
Coldwater	S. C	93	0	20	0	0	2	19	9	37	6	90	0	14	0	4	8	13	4	32	15	93	0	1	1	7	5	12	37	24	6
Kalamazoo	S. C.	93	0	4	2	1	3	22	28	15	18	90	0	5	5	8	3	6	29	8	26	93	0	5	5	2	2	5	52	15	7
Mendon	S. C.	93	0	7	2	1	3	33	15	18	13	75	0	3	9	4	2	9	5	25	18	89	0	3	2	6	1	9	40	20	8
Tecumseh	S. C.	93	8	5	0	3	2	15	27	24	9	90	6	8	7	11	3	4	11	22	18	93	4	3	4	3	7	1	37	23	11
Ypsilanti	S. C.	93	2	1	3	4	0	8	27	33	15	90	0	5	6	7	2	3	1	51	15	93	0	2	3	8	3	2	32	21	19
Detroit	S. E	93	0	6	1	2	1	16	31	20	16	90	1	12	11	9	0	4	15	19	19	93	0	3	3	9	2	1	29	33	13
Woodmere Cem.	S. E.	93	1	6	1	3	0	17	19	30	16	90	4	16	7	7	0	2	12	23	19	93	1	5	4	4	2	4	14	43	16

* The Names of Observers, their Places of Observation, and the Counties in which these Places are situated, are stated in Exhibit 9, page 337.
† The full names of the divisions and the counties in each division are stated in Exhibit 1, page 153.
‡ This line is an average for only the 12 stations from which statements nearly complete were received for every month of the year; it does not include the lines for Petoskey and Ypsilanti.

Graphic representations of statements in this table are given in Diagram XII., opposite this page,—which is explained on page 340.

DIAGRAM No. XII.—DIRECTION OF WIND AT STATIONS, BY MONTHS IN 1878.



SCALE, line .01 of an inch to one observation

Designed by Henry B. Baker

Drawn by F. S. Kedzie.

RELATION OF WIND AND OZONE TO REMOVAL OF FILTH.

Diagram IX., and Table IX. (pages 378 and 379), relating to the rate of the wind, in miles per hour, at different hours of the day, considered in connection with Diagrams VI. and VII., and Tables VII. and VIII. (pages 370, 373, 371, and 372), relating to atmospheric ozone by day and by night, contain a suggestion relative to a part of the work of local boards of health. In some places it is the custom to allow the contents of privy-vaults, etc., to be removed only in the night. So general has the custom been that this material has taken the name "night-soil." Whatever may be the reason for this custom, if the indications of these tables and diagrams are trustworthy, it violates two evident principles which should govern in the removal of filth, namely, that it should be moved when the movement of the air is such as most rapidly to carry away the foul and dangerous exhalations, and when the condition of the air is such as most rapidly to destroy them. These conditions, as a rule, do not seem to prevail during the night; for, as indicated by these tables and diagrams, there seems to be less wind during the night than during the day, in each month of the year, so far as examined; and during the summer there is less ozone by night than by day.

In this connection, it is worthy of note that such diseases as diarrhea, dysentery, cholera morbus, and cholera infantum, are most prevalent during just those months when they would be expected to be if we suppose that absence of wind and of ozone tend to increase such diseases. One who has experienced the sickening odors which are so often encountered in passing along the streets of villages on warm still nights in August, is well prepared to appreciate a comparison of Diagrams VII. and VIII. and the line representing August on Diagram IX. with those lines on Diagram 1, in a subsequent paper, which illustrate the rise and fall of the diseases mentioned above. It will be seen that the lines representing the diseases do not always rise and fall exactly with the lines representing the atmospheric ozone, or the wind in Diagram VIII., but that they seem to follow a little afterwards, much as they might be expected to do if the diseases are effects which follow causes modified by the ozone and by the wind. So far as this evidence bears upon the subject, it would appear that the diseases most increased by filth *in the air* are diarrhea, dysentery, cholera morbus, and cholera infantum. The relation of the autumnal fevers to the prevalence of these diseases in the preceding summer months, is well worthy of study, but can be more profitably studied in the article on Weekly Reports of Diseases. It may be said, in passing, that the evidence of these diagrams (VII., VIII., IX., and 2) is strongly in favor of the view that diphtheria is not a "filth disease;" certainly it is not among those diseases which prevail most when the air purifiers—wind and ozone—are least abundant; on the contrary, it was most prevalent in Michigan, both in 1877 and in 1878, in months when wind and ozone were most abundant; but when for the spread of a communicable disease, other conditions, such as sore throats, exposure in public meetings, bad ventilation, etc., were most favorable.

ATMOSPHERIC PRESSURE.

Compared with the average for the 14 preceding years (in Exhibit 29), the average atmospheric pressure at the Agricultural College in 1878 was greater for the year and greater in every month except April and August. Compared with 1877 the pressure in 1878 at the same station was greater in January, March, June, July, September, and October, and less for the other months and for the year. The average for seven stations in 1878 (Exhibit 28) was greater than the average for seven stations in 1877 (five of the stations being the same for each year) in January, June, July, September, October, and November, and less for the other months and for the year. The details for each month in 1878 at each station may be learned from Table XIII., page 393, and for some of the stations they are graphically represented in Diagram XIII., page 392.

EXHIBIT 28.—*Comparison of the Average Atmospheric Pressure at 7 Stations in 1878 with the Average at 7 Stations in 1877.*

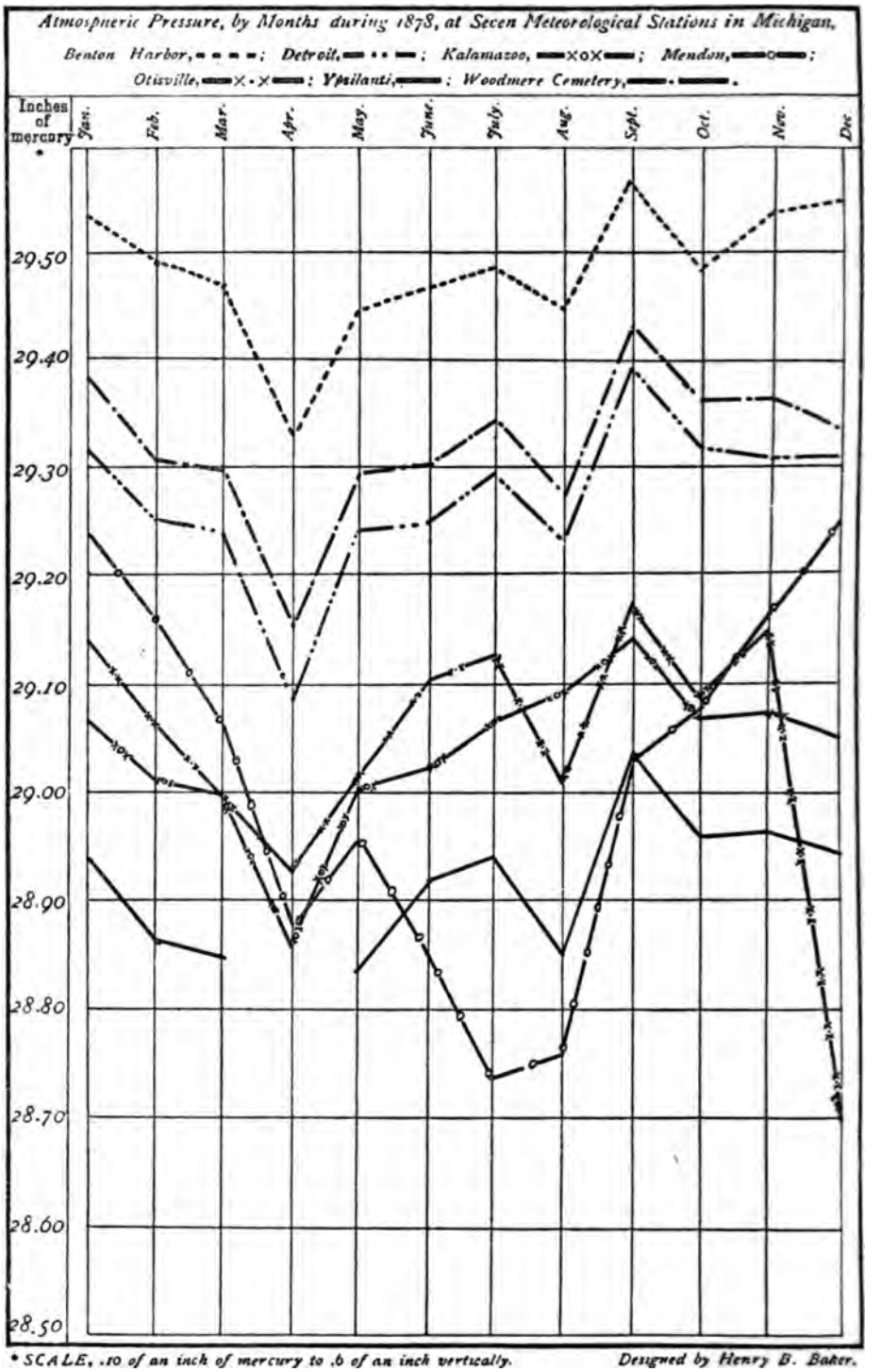
YEARS, ETC.	Inches of Mercury,—Reduced to 32° Fahr.												
	Annual Av.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 7 Stations in 1877*	29.145	29.211	29.267	29.152	29.114	29.143	29.042	29.064	29.063	29.144	29.135	29.164	29.243
Av. for 7 Stations in 1878*	29.116	29.241	29.166	29.137	28.987	29.081	29.043	29.084	29.041	29.194	29.139	29.168	29.164
In 1878 Greater than in 1877	------	.030	------	------	------	------	.001	.020	------	.050	.004	.004	------
In 1878 Less than in 1877	.029	------	.101	.015	.127	.162	------	------	.022	------	------	------	.128

* Five of the stations, namely, Benton Harbor, Battle Creek, Kalamazoo, Mendon, and Woodmere Cemetery (near Detroit), were the same for both years; two, the Agricultural College and Ypsilanti, were included in the average for 1877 but not in that for 1878; and two, Otisville and Detroit, were included in the average for 1878 but not in that for 1877.

EXHIBIT 29.—*Comparison of the Average Atmospheric Pressure during the Year and during each Month of the Year 1878, with Averages for the 14 Years 1864–77 and for the Year 1877.—Inches of Mercury in the Barometer, Corrected for Temperature and for Instrumental Error.—Observations made at 7 A. M., 2 P. M., and 9 P. M. Daily, by Prof. R. C. Kedzie at the State Agricultural College, near Lansing, Michigan.*

YEARS, ETC.	Average Atmospheric Pressure,—Inches of Mercury.												
	Annual Av.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
14 Years 1864-1877	29.012	29.024	29.012	28.976	28.968	28.967	28.995	29.014	29.041	29.076	29.045	29.018	29.044
1877	29.066	29.057	29.124	28.981	28 974	29.056	29.020	29.062	29.046	29.121	29 077	29.099	29.120
1878	29.053	29.099	29.026	29.027	28 875	29.013	29.030	29.085	29.010	29.157	29.080	29.081	29.147
In 1878 Greater than Av. for 14 Years, 1864-77	.041	.075	.014	.051	------	.046	.035	.071	------	.081	.035	.063	.103
In 1878 Less than Av. for 14 Years, 1864-77	------	------	------	------	.093	------	------	------	.031	------	------	------	------
In 1878 Greater than in 1877	------	.042	------	.046	------	------	.010	.023	------	.036	.003	------	------
In 1878 Less than in 1877	.013	------	.098	------	.099	.043	------	------	.036	------	------	.018	.033

DIAGRAM No. XIII.—ATMOSPHERIC PRESSURE, BY MONTHS IN 1878.



* SCALE, .10 of an inch of mercury to .6 of an inch vertically.

Designed by Henry B. Baker.

Drawn by F. S. Redsue.

TABLE XIII.—*Average Atmospheric Pressure, for the Year, and for each Month in the Year 1878, at 8 stations in Michigan, as indicated by the Height, in inches, of Mercury in the Barometer. Corrected for Temperature,—Reduced to 32° F., (not corrected for Instrumental Errors §)—Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M. by Observers* for the State Board of Health, and for the U. S. Signal Service.*

PLACES OF OBSERVATION IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	INCHES OF MERCURY,—ATMOSPHERIC PRESSURE.												
		YEAR, 1878.	MONTHS, 1878.											
			Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
AVERAGE FOR 7 LOCALITIES‡	.....	29.116	29.241	29.166	29.137	28.987	29.061	29.043	29.064	29.041	29.194	29.139	29.168	29.104
Nirvana*	W.†	a	.....	.....	.....	28.851	28.961	28.997	29.049	29.026	29.089	28.998	28.998	28.996
Agricultural College, near Lansing§	C.	29.053	29.099	29.026	29.027	28.875	29.013	29.030	29.085	29.010	29.157	29.080	29.081	29.147
Otisville‖	C.	29.040	29.137	29.063	28.998	28.926	29.013	29.101	29.123	29.009	29.171	29.088	29.145	‖ 28.700
Benton Harbor	S. W.	29.482	29.531	29.493	29.469	29.325	29.444	29.467	29.484	29.444	29.563	29.483	29.536	29.543
Battle Creek	S. C.	28.651	29.020	28.877	28.898	28.692	28.620	28.313	28.547	28.483	28.638	28.584	28.588	28.554
Kalamazoo	S. C.	29.037	29.069	29.012	28.998	28.857	29.001	29.018	29.066	29.091	29.139	29.067	29.073	29.048
Mendon‖	S. C.	29.011	29.236	29.160	29.062	28.875	28.958	28.850	‖ 28.733	‖ 28.758	29.025	29.074	29.161	29.242
Tecumseh	S. C.	b	.....	.....	.....	28.897	29.021	29.004	29.099	29.038	29.085	29.038	29.071	29.048
Ypsilanti	S. C.	c	28.939	28.865	28.849	.....	28.834	28.919	28.939	28.850	29.030	28.960	28.965	28.943
Detroit	S. E.	29.268	29.316	29.248	29.237	29.085	29 238	29.247	29.293	29.228	29.391	29.316	29.307	29.308
Woodmere Cemetery, near Detroit§	S. E.	29.320	29.381	29.307	29.299	29.151	29.294	29.302	29.344	29.271	29.432	29.361	29.366	29.333

a For the 9 months, 28.998. b For the 9 months, 29.033. c For the 11 months, 28.918.

* The Names of Observers, their Places of Observation, and the Counties in which these places are situated, are stated in Exhibit 9, page 337.

† The full names of the divisions and the counties in each division, are stated in Exhibit 1, page 153.

‡ This line is an average for only 7 of the 8 stations from which statements were received for every month of the year. The records for the Agricultural College were not received in time to be included in the average.

§ Error of the instrument at the Agricultural College, + .012 in.; at Woodmere Cemetery, + .010 in. Errors of other instruments not ascertained.

‖ At Otisville in December and at Mendon in July and August the average is so low that it is probable that they are wrong for those months.

The barometer at Otisville was moved from one building to another, in December, 1878, and in the moving was laid on its side. It is possible that in this way a little air entered the tube. This, if true, would explain the very low average for that month. Afterwards the instrument was corrected.

The barometer used at Mendon is not a standard barometer, and cannot be adjusted for changes of level in the cistern. During 1877 and 1878 it hung outdoors and was subjected to great changes of temperature. It has been corrected for temperature by the same tables as the standard barometers. These facts may explain its being so low during the warm months of those years.

The lines for seven representative stations in this table are represented in Diagram XIII., opposite this page.

In compiling the tables and exhibits in this article a fraction less than one-half has been rejected, a fraction equal to or greater than one-half has been counted as one.

HENRY B. BAKER.

WEEKLY REPORTS OF DISEASES

IN MICHIGAN

DURING THE

YEAR ENDING DECEMBER 28, 1878,

INCLUDING A

COMPILATION OF THE WEEKLY REPORTS FROM HEALTH OFFICERS OF CITIES AND FROM REGULAR CORRESPONDENTS OF THE

STATE BOARD OF HEALTH.

Compiled in the Office of the Secretary of the Board.

WEEKLY REPORTS OF DISEASES IN MICHIGAN DURING THE YEAR ENDING WITH DECEMBER, 1878.

This article continues a subject begun in the Fourth Annual Report of this Board (for 1876), in which were given an outline of the proposed plan of securing and of compiling weekly reports of diseases, and two tables compiled from such reports for the month of September, 1876. In the Annual Report for 1877 the plan was further elucidated, as experience had shown to be necessary, and three tables were published for the fiscal year ending with September, 1877, similar to Tables 1, 2, and 3, on pages 400–419 and 422–469 of this Report. In the Report for 1878 the compilation of weekly reports was by similar tables brought down to the close of December, 1877, a summary for the State was given for the calendar year 1877, and by means of three diagrams for that year, similar to those for 1878 on subsequent pages of this article, a graphic representation was made, for each month of the year and for each of the 22 diseases concerning which reports were especially asked, of the per cent of reports which stated that the disease was present. Exhibits were also given for croup, pneumonia, rheumatism, and intermittent fever, in which statements concerning the prevalence of each of these diseases in every month of the year were placed side by side with statements of certain meteorological conditions for the same periods of time, in order to render easy a study of causal relations between the occurrence of the meteorological conditions and the prevalence of the diseases in question. Similar exhibits for these and for other diseases are printed on subsequent pages of this article.

The blanks for the weekly reports upon which this compilation is based are printed on postal cards, which are supplied to such regular Correspondents of the Board as consent to make reports, and to the Health Officers of all cities for which a return of the name of a Health Officer has been received. Blank record books, in which to preserve copies of the reports together with comments, etc., are also supplied to these Observers of Diseases, to be retained by them. The reports are forwarded weekly to the Secretary of the State Board, at Lansing.

The plan of making the report is as follows: Each observer to mark the disease of which there is the greatest number of cases during the week for which the report is made, 1; that of which there is the next greatest number of cases, 2; the next 3, and so on, applying *consecutive* numbers to all the diseases reported present, but marking with the same figure all diseases of which there is the same number of cases; to write 0 opposite each disease mentioned of which there is no case; to apply these numbers without regard to severity of the cases; to include all cases, without regard to when they were taken sick, so long as they are actually sick with the given disease; to include all cases within the knowledge or reasonable belief of the observer, without regard

to who may have charge of them; to indicate the severity of the diseases reported, by the signs =, +, and —, denoting respectively that a disease was usually severe, more than usually, or less than usually severe. It has not seemed best to ask for an exact statement of the number of cases, though a blank is left for that purpose, on the margin of the card, for the convenience of those observers who prefer to state the number of cases rather than the order of prevalence by the foregoing method. To illustrate the method of making the reports the following copy of one of the blanks now in use is given, correctly marked, in the "prevalence" column, for the number of cases stated on the right-hand margin. Names of diseases printed in italics are not printed on the postal blanks, but are supposed to have been written on the report by the observer.

Diseases in .....,
[Please date.]
week ending Sat., ..., *188*.... .

No.		Prevalence. Order. See a.	Severity. See b.	*Cases.*
Ed 15.	Brain, Inflammation of.....	*14*	+	*1*
	Bowels, Inflammation of....	*12*	—	*3*
	Bronchitis.....	*11*	=	*4*
	Cerebro-spinal Meningitis.	*0*	.....	*0*
	Cholera Infantum	*8*	—	*7*
	Cholera Morbus.....	*10*	+	*5*
	Consumption, Pulmonary..	*10*	—	*5*
	Croup, Membraneous.....	*12*	+	*3*
	Diphtheria	*5*	=	*11*
	Diarrhea.....	*3*	=	*15*
	Dysentery	*8*	+	*7*
	Erysipelas.....	*13*	=	*2*
	Fever, Intermittent.....	*2*	+	*19*
	Fever, Remittent.....	*11*	=	*4*
	Fever, Typhoid (Enteric)..	*0*	.....	*0*
	Fever, Typho-malarial.....	*9*	+	*6*
	Influenza	*7*	—	*9*
	Measles.....	*1*	=	*24*
	Neuralgia	*14*	+	*1*
	Pneumonia.....	*9*	=	*6*
	Puerperal Fever.....	*0*	.....	*0*
	Rheumatism	*6*	+	*10*
	Scarlatina.....	*4*	+	*12*
	Small-pox.....	*0*	.....	*0*
	Tonsilitis	*11*	—	*4*
	Whooping-cough	*0*	.....	*0*
	Mumps	*6*	+	*10*
	Dyspepsia.....	*11*	+	*4*

a. Disease of which there is the greatest number of cases, 1; disease having next greatest number of cases, 2; next, 3; and so on for each disease, writing the same figure opposite diseases having the same number of cases. Write 0 opposite those not present. [For earlier plan see "Printed Letter Sending Plan," pages 246–247, Fifth Annual Report of S. B. of H.] A blank indicates that the item has been overlooked.
b. The sign = indicates the usual severity, + indicates more, — indicates less than the usual severity.
Please mail this, signed and dated, as soon as convenient after close of week specified.

....., *M. D.*

Two of the diseases, neuralgia and tonsilitis, were not printed on the cards distributed to observers of diseases previously to October 1, 1878, and not on all used after that date. It is therefore probable that these two diseases were not so generally reported, when prevalent, during the year as were others on the printed blank. Two of the diseases, inflammation of the brain, and inflammation of the bowels, were not printed on the blanks till July, 1879. Hence they are not included in the tables for 1878; because it has been found

that a disease is more likely to be reported when attention is called to it than when no mention of it is thus made.

It will be seen that two classes of statements are included in the prevalence column of the reports, one as to the fact of the occurrence of a disease, a positive, definite statement; the other as to the relative number of cases of the several diseases, often an estimate and always indefinite except as to the fact of there being less cases of one disease than of another, less of a third, still less of a fourth, and so on. A compilation of positive statements concerning the occurrence of a disease will give positive indications as to the area of prevalence and time of prevalence of the disease. Statements of this class are included in Tables 1, 2, and 3, in Diagrams 1, 2, 3, and 4, and in the exhibits correlating statements concerning the prevalence of diseases with statements of coïncident meteorological conditions. An average of the statements as to the order of prevalence of the diseases will be somewhat indefinite; yet it is believed that in the fourth column of figures in Table 2, which contains such an average, some reliable indication is given, for the time specified, as to the relative number of cases of the diseases tabulated.

The comments concerning particular diseases are given in connection with the diagrams and exhibits, on pages following the tables, and near the close of this paper.

In Table 1, pages 400–401, the names of the twenty-two diseases tabulated are arranged in order, by months, according to the per cent of observers who reported each disease present, the disease reported by the greatest per cent of observers in each month in 1878 being placed first in the column for that month. There is also stated for each disease the per cent of observers who reported it present during the corresponding month of 1877. In a study of this table, comparison may be made with statements in Exhibit 4, pages 162, 163, in which is given, by months, the number of correspondents who, in reply to circulars relative to the prevailing diseases in Michigan in each of the years 1875–6–7–8, reported prevalence of many of the same diseases. This table should also be studied in connection with Diagrams 1, 2, 3, and 4, on pages following, which give graphic statements, by months, of the per cent of weekly reports stating presence of each of the diseases here tabulated; in connection with Tables 2 and 3, pages 404–469, which contain additional statements relative to each of these twenty-two diseases; and in connection with Exhibits 33–42, on pages following, wherein comparisons are made by months between the prevalence of certain of the diseases tabulated and given meteorological conditions for the same periods of time. The method by which statements in this table were obtained is stated in foot-notes to Tables 2 and 3, pages 405 and 449.

Table 1 should also be studied in connection with Diagrams I.–XIII., pages 345–392, wherein statements of many of the meteorological conditions in Michigan in 1878 are graphically represented.

Exhibit 30, page 402, gives a general idea of the distribution of the observers of diseases throughout the State, and also of the number of observers reporting in different parts of the State in each month of the year. It states for each of the ten geographical divisions of the State from which weekly reports were received during the year, and also for the whole State, the number of observers from whom reports were received for each month of the year, and for the year 1878, and also the number of weekly reports received each month and for the year. A statement of the counties included in each of these divisions is given in Exhibit 1, page 153. The localities for which reports were received for each month of the year, and the number of reports received from each observer for each month and for the year, are stated in Exhibit 31, pages 420–1.

TABLE 1.—*Exhibiting by Months of the two Years ending December 28, 1878, for each of 22 Diseases, the Per Cent of Observers in Michigan who reported the Presence of each Disease.—Compiled for 1878 from 3,221 Weekly Reports by 97 Health Officers of Cities and Regular Correspondents of the State Board of Health, and for 1877 from 3,320 Weekly Reports by 115 such Health Officers and Correspondents,—Diseases arranged by Months in order of Greatest Number of Observers reporting them present in 1878.*

JANUARY.			FEBRUARY.			MARCH.			APRIL.			MAY.			JUNE.		
Diseases.	Per Ct. of Observers by whom Reported Present in—		Diseases.	Per Ct. of Observers by whom Reported Present in—		Diseases.	Per Ct. of Observers by whom Reported Present in—		Diseases.	Per Ct. of Observers by whom Reported Present in—		Diseases.	Per Ct. of Observers by whom Reported Present in—		Diseases.	Per Ct. of Observers by whom Reported Present in—	
	'78.	'77.		'78.	'77.		'78.	'77.		'78.	'77.		'78.	'77.		'78.	'77.
Average	41	40	Average	40	38	Average	39	36	Average	38	36	Average	39	38	Average	35	34
Rheumatism	88	82	Fever, Intermit.	83	69	Rheumatism	88	79	Fever, Intermit.	92	81	Fever, Intermit.	97	93	Fever, Intermit.	93	96
Fever, Intermit.	86	69	Rheumatism	82	86	Fever, Intermit.	85	71	Rheumatism	87	75	Consumpti'n, P.	80	63	Rheumatism	82	70
Bronchitis	84	85	Bronchitis	82	89	Bronchitis	84	90	Consumpti'n, P.	79	63	Rheumatism	80	83	Consumption, P.	70	61
Consumpti'n, P.	77	66	Consumpti'n, P.	79	52	Consumpti'n, P.	81	59	Bronchitis	79	80	Bronchitis	78	70	Fever, Remit.	70	67
Fever, Remit.	73	52	Pneumonia	75	86	Pneumonia	73	81	Pneumonia	73	72	Pneumonia	68	57	Bronchitis	66	46
Pneumonia	71	88	Fever, Remit.	65	51	Fever, Remit.	67	59	Influenza	63	59	Fever, Remit.	65	72	Pneumonia	56	32
Influenza	66	73	Influenza	62	76	Influenza	62	72	Fever, Remit.	62	58	Influenza	62	57	Influenza	48	33
Diphtheria	51	51	Scarlatina	51	38	Scarlatina	52	34	Diarrhea	40	33	Diarrhea	45	53	Diarrhea	48	56
Erysipelas	47	49	Diarrhea	45	38	Diarrhea	49	37	Diphtheria	38	31	Erysipelas	37	50	Cholera Morbus	30	32
Diarrhea	40	43	Diphtheria	39	38	Diphtheria	38	35	Scarlatina	32	38	Scarlatina	33	33	Scarlatina	28	37
Scarlatina	34	43	Erysipelas	39	41	Erysipelas	32	40	Erysipelas	30	50	Whooping-cough	27	33	Erysipelas	26	33
Fever, Typho-malarial	34	24	Fever, Typho-malarial	24	18	Fever, Typho-malarial	26	21	Fever, Typho-malarial	29	19	Diphtheria	27	15	Dysentery	26	28
Croup, Membran.	22	33	Whooping-cough	18	32	Dysentery	21	12	Whooping-cough	17	23	Dysentery	23	23	Whooping-cough	25	32
Whooping-cough	19	34	Cholera Morbus	18	3	Whooping-cough	15	29	Croup, Membran.	16	13	Fever, Typho-malarial	23	20	Fever, Typho-malarial	25	21
Fever, Typhoid.	19	21	Fever, Typhoid.	15	15	Croup, Membran.	14	22	Dysentery	14	16	Cholera Morbus	13	23	Diphtheria	23	18
Dysentery	16	12	Croup, Membran.	14	21	Cholera Morbus	14	6	Cholera Morbus	13	9	Fever, Typhoid.	10	13	Cholera Infant.	18	26
Puerperal Fev'r	12	16	Dysentery	10	13	Fever, Typhoid	11	9	Fever, Typhoid.	10	16	Croup, Membran.	10	8	Fever, Typhoid.	11	11
Cerebro spl. Men.	7	3	Puerperal Fev'r	8	7	Puerperal Fev'r	8	19	Measles	5	22	Cerebro-spl. Men.	10	7	Croup, Membran.	10	5
Cholera Morbus	7	10	Measles	7	10	Cholera Infant.	8	1	Cholera Infant.	5	3	Measles	8	27	Measles	7	19
Measles	5	12	Cerebro-spl. Men.	7	8	Measles	5	16	Cerebro-spl. Men.	3	6	Puerperal Fev'r	8	10	Puerperal Fev'r	5	9
Cholera Infant.	5	3	Cholera Infant.	6	0	Cerebro-spl. Men.	5	6	Puerperal Fev'r	2	11	Cholera Infant.	7	7	Cerebro-spl. Men.	5	11
Small-pox	0	10	Small-pox	0	6	Small-pox	0	4	Small-pox	0	8	Small-pox	0	10	Small-pox	2	5

JULY.			AUGUST.			SEPTEMBER.			OCTOBER.			NOVEMBER.			DECEMBER.		
Average	40	36	Average	41	40	Average	45	40	Average	47	44	Average	39	40	Average	41	39
Fever, Intermit.	93	93	Fever, Intermit.	94	95	Diarrhea	98	97	Fever, Intermit.	97	93	Fever, Intermit.	92	88	Rheumatism	87	86
Diarrhea	86	89	Diarrhea	94	96	Fever, Intermit.	94	93	Fever, Remit.	84	85	Rheumatism	80	89	Bronchitis	85	91
Fever, Remit.	80	69	Fever, Remit.	80	82	Fever, Remit.	84	80	Rheumatism	82	84	Bronchitis	79	87	Fever, Intermit.	80	82
Rheumatism	73	58	Consumption, P.	71	41	Consumpti'n, P.	76	42	Consumption, P.	79	71	Consumption, P.	75	75	Consumption, P.	77	73
Consumption, P.	71	53	Dysentery	71	91	Rheumatism	73	67	Bronchitis	79	70	Fever, Remit.	74	75	Pneumonia	77	71
Bronchitis	63	37	Rheumatism	65	57	Dysentery	73	82	Fever, Typho-malarial	70	72	Influenza	62	55	Influenza	67	59
Cholera Morbus	63	67	Cholera Infant.	62	63	Bronchitis	65	48	Diarrhea	66	82	Pneumonia	59	57	Fever, Remit.	54	72
Dysentery	51	55	Cholera Morbus	59	77	Fever, Typho-malarial	60	63	Influenza	59	55	Diphtheria	49	46	Diphtheria	54	41
Cholera Infant.	46	38	Bronchitis	56	34	Cholera Infant.	60	45	Pneumonia	49	43	Whooping-cough	43	22	Scarlatina	51	26
Influenza	42	35	Fever, Typho-malarial	39	43	Cholera Morbus	56	58	Diphtheria	46	44	Diarrhea	43	58	Whooping-cough	41	21
Pneumonia	39	24	Influenza	38	27	Influenza	51	35	Whooping-cough	44	26	Fever, Typho-malarial	39	55	Diarrhea	36	33
Fever, Typho-malarial	31	31	Erysipelas	33	23	Scarlatina	35	22	Scarlatina	44	34	Scarlatina	39	37	Erysipelas	34	27
Whooping-cough	27	35	Whooping-cough	30	34	Whooping-cough	32	23	Erysipelas	43	32	Erysipelas	38	26	Fever, Typho-malarial	28	44
Erysipelas	27	25	Scarlatina	27	23	Erysipelas	29	18	Dysentery	43	56	Croup, Membran.	28	16	Croup, Membran.	25	19
Scarlatina	25	29	Pneumonia	26	23	Diphtheria	27	22	Fever, Typhoid.	31	35	Fever, Typhoid	15	38	Fever, Typhoid.	16	28
Diphtheria	22	18	Diphtheria	23	14	Pneumonia	25	25	Cholera Infant.	26	23	Dysentery	13	22	Dysentery	11	15
Measles	10	16	Fever, Typhoid.	18	25	Fever, Typhoid	22	38	Cholera Morbus	18	30	Measles	8	4	Measles	10	5
Fever, Typhoid.	10	7	Measles	8	11	Cerebro-spi. Men.	6	7	Croup, Membran.	16	12	Puerperal Fev'r	8	11	Cholera Morbus	8	9
Small-pox	5	7	Puerperal Fev'r	6	7	Puerperal Fev'r	5	7	Cerebro-spi. Men.	8	10	Cholera Morbus	7	16	Cerebro-spi. Men.	5	8
Puerperal Fev'r	3	2	Cerebro-spi. Men.	3	5	Croup, Membran.	5	10	Puerperal Fev'r	5	10	Cerebro-spi. Men.	5	3	Puerperal Fev'r	3	5
Cerebro-spi. Men.	3	2	Small-pox	2	5	Measles	3	5	Measles	3	1	Cholera Infant.	3	8	Cholera Infant.	2	4
Croup, Membran.	2	2	Croup, Membran.	2	5	Small-pox	2	5	Small-pox	0	4	Small-pox	2	1	Small-pox	0	0

NOTE.—The number of Observers, Reports, Weeks in each Month, etc., are stated in the first five columns of Exhibit 30, page 402.

Table 1 contains, for each month of the year, indications concerning the relative distribution of the several diseases throughout the State. It will be seen that in June while but two per cent of the observers reported the occurrence of small-pox, 93 per cent reported the occurrence of intermittent fever. In 1878 the diseases reported by the greatest number of observers were, rheumatism in January, March, and December; intermittent fever in February, April, May, June, July, August, October, and November; and diarrhea in September. In the study of this table one will be aided by a comparison of its statements with the third and fourth figure-columns in Table 2 for the State, pages 406–9, which show the per cent of reports stating presence of each disease and the average order of prevalence of the diseases where they occurred, whereas this table shows the proportion of observers who reported the diseases as occurring under their observation. The principal part of the sickness in the State would seem to be from six or seven diseases which it is believed, with a more general knowledge of the conditions under which they are most liable to occur, can often be prevented.

EXHIBIT 30.—*Giving, by Months of the Year ending December 28, 1878, for the State, and for each of the Ten Geographical Divisions of Michigan from which Weekly Reports of Diseases were received, the Number of Observers from whom the Reports were received; the Number of Reports received; the Day on which, for the purposes of this Compilation, each Month is made to end; and the Number of Weeks thus included in each Month.*

MONTHS, 1878.	MONTHS END SATURDAY,	Number of Weeks.	STATE.		DIVISIONS OF THE STATE.*																			
					1. Upper-Peninsular.		2. North-Western.		4. North-Eastern.		5. Western.		6. Central.		7. Northern-Central.		8. Bay and Eastern.		9. South-Western.		10. Southern-Central.		11. South-Eastern.	
			Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†
Year 1878	Dec. 28	52	‡97	3,221	3	103	2	34	1	52	6	217	14	549	2	50	18	514	12	391	21	779	18	532
Av. per Month			‡64	268	2	9	§1	§4	1	4	4	18	11	46	1	4	10	43	8	33	16	65	11	44
January	Feb. 2	5	73	353	2	9	0	0	1	5	4	20	13	62	1	5	12	59	8	38	17	82	15	73
February	March 2	4	71	275	2	7	0	0	1	4	4	16	13	50	1	4	11	44	9	35	17	67	13	48
March	March 30	4	73	274	2	8	0	0	1	4	4	14	13	51	1	3	14	48	9	35	18	67	11	44
April	April 27	4	63	241	2	8	0	0	1	4	3	11	11	44	1	4	11	43	8	28	16	60	10	39
May	June 1	5	60	292	2	10	1	4	1	5	4	19	11	53	1	4	9	45	8	39	13	65	10	48
June	June 29	4	61	235	2	6	1	3	1	4	4	16	10	39	1	4	10	37	9	34	13	52	10	40
July	Aug. 3	5	59	285	2	8	1	3	1	5	4	19	10	49	1	5	9	45	7	33	14	69	10	49
August	Aug. 31	4	66	255	3	12	1	4	1	4	5	20	9	36	1	4	10	37	8	32	17	66	11	40
September	Sept. 28	4	63	244	3	11	1	4	1	4	5	20	9	36	1	4	9	36	8	29	17	66	9	34
October	Nov. 2	5	61	293	3	12	1	5	1	5	5	24	10	48	1	5	9	43	7	34	15	72	9	45
November	Nov. 30	4	61	240	2	8	2	7	1	4	5	18	10	40	1	4	10	39	7	28	14	56	9	36
December	Dec. 28	4	61	234	1	4	1	4	1	4	5	20	11		1	4	10	38	7	26	15	57	9	36

* For counties in each Division, see Exhibit 1, page 153. † Reports were not received from all of the Observers, for every week, so that the number of reports received does not equal the number of Observers multiplied by the number of weeks in the given month or in the year.

‡ In some localities there were more Observers than one. The whole number of localities from which reports were received was 74; the average number per month was 56. The number of cards received from each Observer for each month and for the year is stated in Exhibit 31, pages 420-1.

§ Average for 8 months.

Table 2, pages 404–419, exhibits for the State and for each of the geographical divisions of the State from which weekly reports have been received, a summary, for the year and for each month of the year 1878, of statements tabulated in Table 3, on pages 422–469 of this Report, in which the reports received from each locality are compiled by months, and an average is given for each of the 10 geographical divisions of the State.

As in the Reports for 1877 and 1878, Table 2 includes statements for the State for the entire year and by months, and also statements by months for the several geographical divisions from which weekly reports have been received. For want of room in the Report, however, that part of the table which relates to the geographical divisions has been shortened 75 per cent, in the following manner: the columns for "Times reported more or less than usually severe" have been omitted altogether, the columns for "Average per cent of weeks reported present where present," and "Average order of prevalence where present," except for the line "Average for tabulated diseases reported present," have been printed in the lines for the same divisions in Table 3.

In stating the per cent of observers who reported a disease present, the first column of Table 2 indicates, approximately, the area of prevalence of the disease. The second column of Table 2 states for the localities at which a disease was reported present, during the year or during any month of the year 1878, the average per cent of weeks it was reported present in the State. The third column of Table 2 for the State, by combining the statements of the two preceding columns gives an idea of the *time* of prevalence of each disease and the *area* of its prevalence, by which comparisons may be made as to the prevalence of different diseases. The last four columns of Table 2 relate to the severity of the diseases. They were compiled directly from the weekly card-reports. It will be seen that statements relative to the severity of diseases reported present are not made by all observers for all diseases thus reported. Diagrams 1, 2, 3, and 4, on following pages, give by months for each of the 22 diseases tabulated graphic representations of statements, in the third column of figures in Table 2 for the State, of the per cent of weekly reports stating presence of the disease.

Table 2 was compiled from Table 3, on pages 422–469 of this volume. In compiling it, a fraction less than one-half was rejected; a fraction equal to or greater than one-half was counted as one. For other comments on this table, see pages 251–253 of the Annual Report for 1877; and pages 256–257, and 261 of the Report for 1878. For statement of the plan of marking the card-reports, see pages 397–8. An article on the Principal Meteorological Conditions in Michigan in 1878, illustrated with graphic representations, by months, of the leading conditions, is given on pages 335–394. Graphic representations, by months, of statements in the fifth column of pages 406–9 of this table for the State are given in Diagrams 1, 2, 3, and 4, on pages following, near the close of this article; where, also, in Exhibits 33–42, the statements in this column concerning the following ten diseases, Bronchitis, Cholera Infantum, Consumption, Croup, Diarrhea, Diphtheria, Influenza, Intermittent Fever, Pneumonia, and Rheumatism, are compared, by months, with given meteorological conditions for the same periods of time.

TABLE 2.—*Exhibiting for the Year, and for each Month of the Year, ending Saturday, December 28, 1878, a Summary relative to Diseases in the State of Michigan; also for each Month a Summary relative to Diseases in each of 10 Geographical Divisions* of the State,—Indicating the Prevalence as regards both Time and Area, and also the Comparative Severity of the Diseases.—Compiled from 3,221 Weekly Reports by 97 Health Officers of Cities and Regular Correspondents of the State Board of Health.*

No. of Observers, No. of Reports, Etc.	Diseases.	Per Cent of Observers Reporting Presence of.[b]	Av. Per Ct. of Weeks Reported Present Where Present.[c]	Per Cent of Reports Stating Presence of.[d]	Av. Order of Prevalence Where Present.[e]	Times Reported More than Usually Severe.	Times Reported Usually Severe.	Times Reported Less than Usually Severe.	Difference between "Times Reported More" and "Times Reported Less" than Usually Severe.[f]	Av. Times per Month Reported More than Usually Severe.	Av. Times per Month Reported Usually Severe.	Av. Times per Month Reported Less than Usually Severe.	Av. Difference between "Times More" and "Times Less" Severe.[f]
For the Year Ending December 28, 1878.†	Average for Tabulated Diseases Reported Present, not including Neuralgia or Tonsilitis ‡	39	76	30	4.4	65.7	558.9	229.2	-163.5	5.5	46.6	19.1	-13.6
Whole No. of Localities represented, 74;	Bronchitis	75	86	64	3.3	133	1313	446	-313	11.1	109.4	37.2	-26.1
	Cerebro-spinal Meningitis	6	37	2	5.9	17	33	24	-7	1.4	2.8	2.0	-0.6
	Cholera Infantum	20	57	11	5.7	42	182	113	-71	3.5	15.2	9.4	-5.9
Av. No. of Localities represented per month, 56;	Cholera Morbus	25	56	14	5.7	35	270	104	-69	2.9	22.5	8.7	-5.8
	Consumption, Pulmonary	76	92	71	5.2	70	1714	163	-93	5.8	142.8	13.6	-7.8
	Croup, Membraneous	14	49	7	7.1	27	92	63	-36	2.3	7.7	5.3	-3.0
	Diphtheria	37	62	23	5.4	80	305	277	-197	6.7	25.4	23.1	-16.4
Whole No. of Observers during the year, 97;	Diarrhea	57	72	41	4.2	95	680	405	-310	7.9	56.7	33.8	-25.8
	Dysentery	30	63	19	5.9	45	297	211	-166	3.8	24.8	17.6	-13.8
	Erysipelas	35	61	21	6.4	55	385	172	-117	4.6	32.1	14.3	-9.8
Av. No. of Observers per month, 64;	Fever, Intermittent	90	90	82	2.1	202	1584	571	-369	16.8	132.0	47.6	-30.8
	Fever, Remittent	71	81	58	3.1	98	1067	480	-382	8.2	88.9	40.0	-31.8
	Fever, Typhoid (Enteric)	16	59	10	7.0	42	124	101	-59	3.5	10.3	8.4	-4.9
Total No. of Reports Compiled, 3,221[a];	Fever, Typho-malarial	35	67	24	5.4	54	446	215	-161	4.5	37.2	17.9	-13.4
	Influenza	57	77	44	3.1	130	844	327	-197	10.8	70.3	27.3	-16.4
	Measles	7	68	5	5.3	16	98	20	-4	1.3	8.2	1.7	-0.3
	Neuralgia ‡	14	69	10	4.6	37	206	30	+7	3.1	17.2	2.5	+0.6

Av. No. of Reports per month, 268.	Pneumonia	58	71	41	4.8	74	757	331	-257	6.2	63.1	27.6	-21.4
	Puerperal Fever	6	40	3	6.3	9	33	18	-9	0.8	2.8	1.5	-0.8
	Rheumatism	81	84	68	4.2	112	1312	484	-372	9.3	109.3	40.3	-31.0
	Scarlatina	33	66	25	5.4	53	369	326	-273	4.4	30.8	27.2	-22.8
	Small-pox	1	26	0.2	3.9	0	3	2	-2	0.0	0.6	0.4	-0.4
	Tonsilitis ‡	17	65	11	4.4	62	206	31	+31	5.2	17.2	2.6	+2.6
	Whooping-cough	23	76	21	4.7	57	388	190	-133	4.8	32.3	15.8	-11.1

* For Counties in each Division, see Exhibit 1, page 153. † For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 30, page 402; for Names of Observers and number of reports received from each, see Exhibit 31, pages 420–421.

‡ Neuralgia and Tonsilitis were not printed on any of the postal blanks issued before October 1, 1878, and not on all used after that time; it is therefore probable that the reports concerning these two diseases were not uniformly made throughout the year, and that they were not at any time so complete as those concerning the other diseases; hence these two diseases are not included in the "Average for Tabulated Diseases Reported Present."

a Not every one of the Observers sent in a report for every week, so that the number of reports received does not equal the number of Observers multiplied by the number of weeks.

b Indicates the Area of Prevalence, except that in a few instances there were two or more Observers in one city or village.

c This column gives the per cent which the number of reports stating presence of a disease is of the number of card-reports *received* from such of the Observers as reported the disease present. It is, therefore, an average not for all localities represented, but only for those at which the given disease was reported present. In the line "Av. for Tabulated Diseases," it gives the per cent which the number of times *all* diseases are reported present is of the number of times they *might have been* so reported on the cards received, for the time specified, from the Observers who reported the diseases present at all. It will be seen that this is a more accurate average than would be obtained by dividing the sum of the column by the number of diseases reported present.

d This column gives the per cent which the number of reports stating presence of a disease is of the whole number of reports received, for the time specified, from *all Observers* in the State or Division, as the case may be. It combines and states, in a general way, an idea of the *time* a disease was prevalent, with an idea of the area of its prevalence. Had every Observer sent a report every week of the month or year, the numbers in this column would be (for the State) the product of the numbers in the same line in the two preceding columns.

e The disease having the greatest number of cases was to be marked 1 in the order; the disease having the next greatest number of cases, 2; and so on. Diseases not present were to be marked 0. The numbers in this column are found by dividing the totals (for the State or for the Division) of the Order of Prevalence columns, in Table 3, by the number of men who reported the disease present. The column is, therefore, an average not for all the localities represented, but only for those at which the given disease was reported present. The "Av. for Tabulated Diseases" is found by dividing the sum of the totals in the Order of Prevalence columns, in Table 3, for all diseases reported prevalent, by the sum of the numbers of men who reported the different diseases prevalent, thus counting each man once for every disease he reported prevalent.

f The + sign indicates that the times reported "more" exceed those reported "less" than usually severe; the - sign, that the times reported "less" exceed those reported "more" than usually severe, the number of times by which either exceeds the other being indicated by the numbers stated.

TABLE 2.—*Continued.—Diseases in the State,—Jan. to June, 1878.* (*For foot-notes and Full tabular heads, see pages 404–5.*)

Months.	Diseases.	Per ct. of Observers Report'g Pres. of. b	Av. per ct. of Weeks Reported Present where Present. a,c	Per ct. of Reports Stating Pres'ce of. d	Av. Order of Prevalence where Pres. e	Times Rep'ted More than usually Severe.	Times Rep'ted Usually Severe.	Times Rep'ted Less than usually Severe.	Difference between Times "More" and "Less" Severe. f
January.†	Av. for Tabulated Diseases Reported Present. ‡	41	73	30	4.0	6.0	63.8	26.1	-20.1
	Bronchitis	84	92	77	2.9	14	185	53	-39
	Cerebro-spinal Meningitis	7	44	3	5.2	2	6	3	-1
	Cholera Infantum	5	42	2	5.3	2	1	5	-3
	Cholera Morbus	7	24	2	4.8	0	3	3	-3
	Consumption, Pulmonary	77	88	67	5.0	10	193	10	0
	Croup, Membraneous	22	45	10	5.6	2	12	14	-12
	Diphtheria	51	58	30	4.9	10	43	45	-35
	Diarrhea	40	63	26	5.0	3	38	35	-32
	Dysentery	16	49	8	6.7	2	10	15	-13
	Erysipelas	47	49	23	5.4	12	44	18	-6
	Fever, Intermittent	86	80	69	2.6	17	143	65	-48
	Fever, Remittent	73	75	55	3.0	7	113	55	-48
	Fever, Typhoid (Enteric)	19	59	12	5.6	4	25	13	-9
	Fever, Typho-malarial	34	66	23	5.2	1	40	29	-28
	Influenza	66	75	49	2.5	12	112	37	-25
	Measles	5	84	5	4.8	0	10	5	-5
	Neuralgia ‡	8	77	7	3.0	0	9	7	-7
	Pneumonia	71	79	54	4.1	9	115	41	-32
	Puerperal Fever	12	35	4	4.4	2	6	5	-3
	Rheumatism	88	86	75	3.6	8	174	49	-41
	Scarlatina	34	67	23	4.9	6	36	37	-31

Months.	Diseases.	Per ct. of Observers Report'g Pres. of. b	Av. per ct. of Weeks Reported Present where Present. a,c	Per ct. of Reports Stating Pres'ce of. d	Av. Order of Prevalence where Pres. e	Times Rep'ted More than usually Severe.	Times Rep'ted Usually Severe.	Times Rep'ted Less than usually Severe.	Difference between Times "More" and "Less" Severe. f
February.†	Av. for Tabulated Diseases Reported Present. ‡	40	76	30	4.3	5.2	45.3	22.6	-17.4
	Bronchitis	82	91	75	2.6	15	117	48	-33
	Cerebro-spinal Meningitis	7	35	3	5.2	3	3	1	+2
	Cholera Infantum	6	56	3	8.8	4	2	3	+1
	Cholera Morbus	18	39	7	5.9	1	10	7	-6
	Consumption, Pulmonary	79	92	72	5.2	9	145	15	-6
	Croup, Membraneous	14	44	6	7.4	0	5	10	-10
	Diphtheria	39	60	24	4.7	10	14	34	-24
	Diarrhea	45	65	29	4.6	6	28	40	-34
	Dysentery	10	69	7	7.9	1	8	9	-8
	Erysipelas	39	58	23	5.9	4	38	17	-13
	Fever, Intermittent	83	78	66	2.7	4	112	49	-45
	Fever, Remittent	65	82	53	3.5	1	81	45	-44
	Fever, Typhoid (Enteric)	15	60	9	8.0	6	10	9	-3
	Fever, Typho-malarial	24	69	17	6.7	1	23	19	-18
	Influenza	62	84	52	2.4	15	82	27	-12
	Measles	7	55	4	4.8	1	9	1	0
	Neuralgia ‡	7	63	4	4.4	1	5	1	0
	Pneumonia	75	80	60	4.2	12	90	49	-37
	Puerperal Fever	8	29	3	6.5	0	2	2	-2
	Rheumatism	82	92	75	3.9	8	121	49	-41
	Scarlatina	51	58	29	4.8	5	34	34	-29

Months.	Diseases.	Per ct. of Observers Report'g Pres. of. b	Av. per ct. of Weeks Reported Present where Present. a,c	Per ct. of Reports Stating Pres'ce of. d	Av. Order of Prevalence where Pres. e	Times Rep'ted More than usually Severe.	Times Rep'ted Usually Severe.	Times Rep'ted Less than usually Severe.	Difference between Times "More" and "Less" Severe. f
March.†	Av. for Tabulated Diseases Reported Present. ‡	39	78	31	4.3	6.1	47.4	22.3	-16.2
	Bronchitis	84	89	74	2.6	19	113	52	-33
	Cerebro-spinal Meningitis	5	25	1	4.5	1	2	1	0
	Cholera Infantum	8	29	3	6.7	4	1	1	+3
	Cholera Morbus	14	58	8	7.3	4	17	3	+1
	Consumption, Pulmonary	81	93	76	5.2	8	153	17	-9
	Croup, Membraneous	14	62	9	6.8	2	14	7	-5
	Diphtheria	38	58	23	5.6	8	22	30	-22
	Diarrhea	49	70	34	4.0	10	43	26	-16
	Dysentery	21	66	8	6.4	8	6	6	+2
	Erysipelas	32	71	22	6.4	7	36	11	-4
	Fever, Intermittent	85	86	74	2.5	12	117	51	-39
	Fever, Remittent	67	76	52	3.5	8	78	39	-31
	Fever, Typhoid (Enteric)	11	56	7	9.1	5	2	8	-3
	Fever, Typho-malarial	26	62	16	6.6	2	20	20	-18
	Influenza	62	82	52	2.7	12	82	37	-25
	Measles	5	69	4	5.8	0	6	0	0
	Neuralgia ‡	8	50	4	3.0	4	7	0	+4
	Pneumonia	73	82	61	3.8	7	98	43	-36
	Puerperal Fever	8	50	4	6.3	1	7	3	-2
	Rheumatism	88	88	77	4.0	7	127	51	-44
	Scarlatina	52	67	35	5.0	2	37	47	-45

	Small-pox	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Tonsilitis‡	10	79	7	3.1	6	18	0	+6		6	73	4	4.3	3	2	2	+1		7	75	5	3.4	2	10	0	+3
	Whooping-cough	19	77	14	4.5	4	31	12	-8		18	65	11	4.9	3	18	7	-4		15	82	13	4.6	1	14	16	-15
	Av. for Tabulated Diseases Reported Present‡	38	78	29	4.2	4.6	41.3	18.0	-13.4		39	74	28	4.1	4.3	51.1	20.1	-15.8		35	75	26	4.2	4.6	35.5	15.5	-10.9
APRIL†	Bronchitis	79	89	71	2.6	7	112	40	-33	MAY†	78	83	65	3.0	5	127	46	-41	JUNE†	66	85	56	3.1	9	84	32	-23
	Cerebro-spinal Meningitis	3	25	1	5.5	0	1	1	-1		10	47	5	7.0	5	8	2	+3		5	33	2	3.3	3	1	0	+3
	Cholera Infantum	5	42	2	7.7	0	0	5	-5		7	56	3	7.0	0	2	8	-8		18	48	8	7.3	0	7	10	-10
	Cholera Morbus	13	39	5	6.8	1	5	6	-5		13	37	5	7.0	0	3	11	-11		30	47	14	6.2	3	16	12	-9
	Consumption, Pulmonary	79	93	75	4.9	12	138	8	+4		80	89	72	4.3	5	158	13	-8		70	95	68	4.9	4	121	6	-2
	Croup, Membraneous	16	53	8	7.5	3	3	8	-5		10	52	5	7.2	1	6	8	-7		10	33	3	6.3	1	2	2	-1
	Diphtheria	38	58	22	6.5	2	20	25	-23		27	54	14	6.9	5	13	22	-17		23	51	12	5.4	2	17	9	-7
	Diarrhea	40	65	27	4.5	9	35	19	-10		45	73	33	4.6	3	53	34	-31		48	69	33	4.4	8	31	32	-24
	Dysentery	14	70	10	6.8	3	13	9	-6		23	63	15	6.1	1	19	21	-20		26	70	18	6.5	1	18	18	-17
	Erysipelas	30	72	21	6.2	7	32	9	-2		37	50	18	6.1	1	30	19	-18		26	75	19	7.3	0	30	9	-9
	Fever, Intermittent	92	90	83	2.3	9	119	49	-40		97	94	91	1.6	18	165	54	-36		93	97	92	1.5	21	129	44	-23
	Fever, Remittent	62	73	45	3.3	7	56	28	-21		65	74	48	3.0	2	97	35	-33		70	77	55	2.7	9	70	38	-29
	Fever, Typhoid (Enteric)	10	43	4	8.8	0	2	8	-8		10	63	7	7.7	1	4	10	-9		11	50	6	6.6	1	6	5	-4
	Fever, Typho-malarial	29	75	21	5.2	7	24	15	-8		23	63	14	5.0	3	25	10	-7		25	61	15	5.2	2	20	12	-10
	Influenza	63	87	54	2.9	11	78	32	-21		62	75	46	2.9	12	77	38	-26		48	78	37	3.2	8	51	30	-22
	Measles	5	67	3	5.3	0	8	0	0		8	54	4	4.2	2	7	1	+1		7	80	5	5.5	3	7	1	+2
	Neuralgia‡	8	53	4	3.2	2	8	0	+2		7	65	4	4.0	2	11	0	+2		7	67	4	4.0	0	8	0	0
	Pneumonia	73	76	56	4.2	3	81	36	-33		68	65	45	4.7	6	89	22	-16		56	60	33	5.0	6	37	20	-14
	Puerperal Fever	2	25	0.4	3.0	0	0	0	0		8	35	3	6.0	2	3	1	+1		5	55	3	5.7	0	5	0	0
	Rheumatism	87	86	75	3.9	8	109	42	-34		80	84	67	3.6	9	125	36	-27		82	79	65	4.1	8	85	38	-30
	Scarlatina	32	75	24	6.2	3	20	29	-26		33	61	21	5.4	2	37	14	-12		28	71	20	4.5	5	27	17	-13
	Small-pox	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		2	50	1	5.0	0	0	0	0
	Tonsilitis‡	13	48	6	4.1	1	10	2	-1		5	50	2	3.0	0	5	1	-1		3	63	2	5.0	0	3	2	-3
	Whooping-cough	17	68	12	5.0	5	12	10	-5		27	65	17	4.9	8	25	17	-9		25	65	17	4.7	8	16	7	+1

TABLE 2.—*Continued.—Diseases in the State,—July to Dec., 1878.* (*For foot-notes and Full tabular heads, see pages 404–5.*)

Months.	Diseases.	Per ct. of Observers Report'g Pres. of. *b*	Av. per ct. of Weeks Reported Present where Present. *a,c*	Per ct. of Reports Stating Pres'ce of. *d*	Av. Order of Prevalence where Pres. *e*	Times Rep'r'd More than usually Severe.	Times Reported Usually Severe.	Times Rep'ted Less than usually Severe.	Difference between Times "More" and "Less" Severe. *f*	Months.	Per ct. of Observers Report'g Pres. of. *b*	Av. per ct. of Weeks Reported Present where Present. *a,c*	Per ct. of Reports Stating Pres'ce of. *d*	Av. Order of Prevalence where Pres. *e*	Times Rep'r'd More than usually Severe.	Times Reported Usually Severe.	Times Rep'ted Less than usually Severe.	Difference between Times "More" and "Less" Severe. *f*	Months.	Per ct. of Observers Report'g Pres. of. *b*	Av. per ct. of Weeks Reported Present where Present. *a,c*	Per ct. of Reports Stating Pres'ce of. *d*	Av. Order of Prevalence where Pres. *e*	Times Rep'r'd More than usually Severe.	Times Reported Usually Severe.	Times Rep'ted Less than usually Severe.	Difference between Times "More" and "Less" Severe. *f*
July.†	Av. for Tabulated Diseases Reported Present‡	40	71	28	4.2	4.8	46.8	17.0	-12.2	August.†	41	78	32	4.6	7.9	48.0	17.1	-9.2	September.†	45	78	35	4.6	7.0	50.1	18.8	-11.9
	Bronchitis	63	66	41	4.1	10	69	23	-13		56	79	45	5.0	10	70	24	-14		65	84	55	4.4	7	84	27	-20
	Cerebro-spinal Meningitis	3	20	1	5.5	0	0	2	-2		3	38	1	7.0	0	1	1	-1		6	25	2	7.5	0	3	4	-4
	Cholera Infantum	46	60	27	5.1	11	42	13	-2		62	69	42	4.6	13	56	31	-18		60	60	37	5.7	7	53	22	-15
	Cholera Morbus	63	56	35	4.5	8	66	14	-6		59	79	47	4.9	9	76	22	-13		56	57	32	5.9	4	50	16	-12
	Consumption, Pulmonary	71	96	68	5.1	1	149	12	-11		71	91	65	5.7	3	129	12	-9		76	92	70	6.0	5	122	20	-15
	Croup, Membranous	2	20	0.4	3.0	0	1	0	0		2	25	0.4	2.0	0	1	0	0		5	42	2	6.3	2	3	0	+2
	Diphtheria	22	55	12	4.5	5	17	11	-6		23	68	16	5.6	6	22	10	-4		27	69	19	4.8	10	23	12	-2
	Diarrhea	86	74	64	3.1	10	90	51	-41		94	89	84	2.9	25	113	47	-22		98	81	80	3.5	15	102	60	-45
	Dysentery	51	58	29	5.8	2	47	20	-18		71	72	51	4.8	15	74	30	-15		73	69	51	5.0	8	53	49	-41
	Erysipelas	27	58	16	6.0	2	23	10	-8		33	61	20	7.0	2	27	15	-13		29	57	16	7.1	2	23	12	-10
	Fever, Intermittent	93	96	90	1.5	20	153	38	-18		94	97	91	1.7	27	136	41	-14		94	98	92	1.6	30	138	32	-2
	Fever, Remittent	80	79	63	2.9	11	100	39	-28		80	86	69	2.8	18	104	32	-14		84	94	79	2.6	22	120	28	-6
	Fever, Typhoid (Enteric)	10	57	6	8.7	2	4	1	+1		18	52	10	6.9	7	10	3	+4		22	57	13	7.1	6	15	9	-3
	Fever, Typho-malarial	31	60	18	5.4	1	28	18	-17		39	65	25	5.8	15	28	14	+1		60	74	45	4.8	10	70	15	-5
	Influenza	42	64	27	4.2	3	45	20	-17		38	66	24	5.2	4	34	17	-13		51	75	38	4.0	10	53	21	-11
	Measles	10	62	6	6.2	2	14	2	0		8	60	5	6.2	0	8	4	-4		3	86	2	6.5	1	5	0	+1
	Neuralgia‡	5	69	3	4.7	1	3	0	+1		3	63	2	5.5	0	4	1	-1		6	60	4	7.3	0	7	0	0
	Pneumonia	39	53	22	6.0	0	30	21	-21		26	68	18	7.2	0	32	11	-11		25	71	18	6.8	3	23	11	-8
	Puerperal Fever	3	40	1	4.5	0	0	1	-1		6	33	2	9.3	0	2	2	-2		5	58	3	8.7	0	3	4	-4
	Rheumatism	73	79	57	4.6	7	99	32	-25		65	78	51	5.3	12	73	23	-11		73	81	56	5.1	4	89	33	-29
	Scarlatina	25	66	17	4.8	2	23	24	-22		27	73	20	6.7	3	26	23	-20		25	70	25	5.0	4	26	26	-23

	Small-pox	5	20	1	3.3	0	1	1	-1		2	25	0.4	7.0	0	1	0	0		2	25	0.4	2.0	0	1	0	0
	Tonsilitis‡	3	67	2	5.5	1	4	1	0		8	45	4	4.4	2	4	2	0		8	63	5	5.0	1	8	1	0
	Whooping-cough	27	79	22	4.0	9	29	21	-12		30	79	23	5.7	5	33	15	-10		32	82	27	4.9	3	42	13	-10
	Av. for Tabulated Diseases Reported Present‡	47	72	34	4.6	6.4	60.2	21.8	-15.4		39	77	30	4.6	5.2	40.6	18.5	-13.2		41	79	32	4.8	5.2	44.9	18.0	-12.8
	Bronchitis	79	76	60	3.7	13	119	32	-19		79	93	73	3.2	13	103	38	-25		85	93	81	3.0	11	130	31	-20
	Cerebro-spinal Meningitis	8	36	3	5.6	0	6	3	-3		5	50	3	7.0	3	0	3	0		5	50	3	7.0	0	2	3	-3
	Cholera Infantum	26	37	10	5.9	1	16	9	-8		3	63	2	8.5	0	1	4	-4		2	100	1	8.0	0	1	2	-2
	Cholera Morbus	18	58	10	6.7	3	20	5	-2		7	38	2	9.5	0	2	2	-2		8	44	3	7.2	2	2	3	-1
	Consumption, Pulmonary	79	93	73	5.4	7	159	16	-9		75	96	73	5.5	0	131	18	-18		77	91	71	5.6	6	116	16	-10
	Croup, Membraneous	16	36	6	6.9	3	9	0	+3		28	49	14	7.9	6	17	4	+2		25	67	16	8.6	7	19	10	-3
	Diphtheria	46	58	27	5.6	6	34	20	-14		49	73	35	5.5	9	37	29	-20		54	75	40	5.2	7	43	30	-23
	Diarrhea	66	73	47	4.6	5	83	37	-32		43	54	23	6.2	1	38	10	-9		36	55	20	7.1	0	26	14	-14
	Dysentery	43	56	24	6.4	3	32	26	-23		13	57	7	8.9	1	11	4	-3		11	43	5	9.0	0	6	4	-4
	Erysipelas	43	60	26	6.9	5	39	17	-12		38	69	25	7.0	7	30	19	-12		34	75	26	6.7	6	33	16	-10
OCTOBER.†	Fever, Intermittent	97	93	90	1.7	25	167	46	-21	NOVEMBER.†	92	87	80	2.2	11	108	59	-48	DECEMBER.†	80	84	68	2.9	8	97	43	-35
	Fever, Remittent	84	87	73	2.5	9	131	53	-44		74	76	56	3.5	1	67	46	-45		54	84	46	4.5	3	50	42	-39
	Fever, Typhoid (Enteric)	31	6	18	6.1	3	27	16	-13		15	72	11	5.9	2	8	9	-7		16	73	12	6.9	5	11	10	-5
	Fever, Typho-malarial	70	68	48	4.6	9	96	30	-21		39	71	28	5.4	2	39	24	-22		28	67	19	7.1	1	33	9	-8
	Influenza	59	71	41	3.1	14	71	21	-7		62	81	50	2.8	15	74	22	-7		67	83	57	2.7	14	85	25	-11
	Measles	3	100	3	7.0	3	6	1	+2		8	65	5	5.2	3	5	3	0		10	71	7	4.3	1	13	2	-1
	Neuralgia‡	31	66	20	5.7	4	43	5	-1		41	75	31	4.5	7	46	11	-4		46	77	36	4.7	16	55	5	+11
	Pneumonia	49	57	28	6.3	4	47	19	-15		59	67	40	5.1	12	49	23	-11		77	72	55	4.8	12	66	35	-23
	Puerperal Fever	5	53	3	7.7	0	3	0	0		8	30	3	6.6	2	2	0	+2		3	57	2	8.0	2	0	0	+2
	Rheumatism	82	80	65	4.5	9	105	53	-44		80	84	67	4.3	17	89	42	-25		87	90	79	4.0	15	116	36	-21
	Scarlatina	44	63	28	6.0	7	38	26	-19		39	68	26	5.6	5	27	26	-21		51	64	32	5.8	9	38	23	-14
	Small-pox	0	0	0	0	0	0	0	0		2	25	0.4	3.0	0	0	1	-1		0	0	0	0	0	0	0	0
	Tonsilitis‡	39	54	21	5.7	8	37	8	0		48	77	36	4.8	18	48	9	+9		59	67	40	3.8	20	57	3	+17
	Whooping-cough	44	71	32	4.7	5	57	27	-22		43	84	36	4.1	5	55	20	-15		41	91	38	4.5	1	56	25	-24

TABLE 2.—*Continued.—Diseases in the Upper-Peninsular and the North-Western Divisions* of the State, by Months in 1878.* (*† *For footnotes and Full tabular heads, see pages 404–5.*)

Divisions.*	Diseases.	Jan.†		Feb.†		March.†		April.†		May.†		June.†		July.†		Aug.†		Sept.†		Oct.†		Nov.†		Dec.†	
		Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d
Upper-Peninsular Division.*	Av. for Tabulated Diseases Reported Present. ‡	67	57	62	55	64	55	75	54	75	59	79	71	75	53	72	59	82	70	63	46	70	56	100	79
	Bronchitis	50	44	50	43	50	50	50	50	100	80	100	100	100	38	33	25	100	91	100	83	100	100	100	100
	Cerebro-spin'l Meningitis	.....	....	.....	....	.....	....	0	0	0	0	0	0	.....	....	0	0	0	0	33	33	0	0	0	0
	Cholera Infantum	.....	....	0	0	.....	....	0	0	50	20	100	67	100	63	100	100	100	73	33	8	0	0	0	0
	Cholera Morbus	.....	....	50	14	50	38	50	13	0	0	100	83	100	88	100	100	100	82	33	17	0	0	0	0
	Consumption, Pulmon'ry	50	33	100	57	50	50	100	63	50	50	50	50	100	63	100	75	100	100	67	67	100	100	100	100
	Croup, Membraneous	.....	....	0	0	50	13	50	13	0	0	0	0	.....	....	0	0	0	0	67	25	0	0	0	0
	Diphtheria	.....	....	0	0	.....	....	0	0	50	20	0	0	.....	....	0	0	.....	....	0	0	0	0	0	0
	Diarrhea	50	56	100	86	100	88	100	88	100	100	100	100	100	100	100	100	100	100	100	83	50	25	0	0
	Dysentery	50	22	0	0	50	25	50	50	100	80	100	83	100	63	100	100	100	91	33	33	0	0	0	0
	Erysipelas	50	33	50	57	50	38	100	38	100	60	100	83	50	13	67	33	100	64	67	58	0	0	0	0
	Fever, Intermittent	.....	....	0	0	.....	....	0	0	0	0	0	0	.....	....	0	0	.....	....	33	17	0	0	0	0
	Fever, Remittent	50	56	50	57	50	50	50	50	50	50	50	50	50	50	33	33	33	36	33	33	100	63	0	0
	Fever, Typhoid (Enteric)	.....	....	0	0	.....	....	0	0	50	50	0	0	50	38	67	17	67	45	100	58	50	25	100	50
	Fever, Typho-malarial	.....	....	0	0	.....	....	0	0	0	0	0	0	.....	....	0	0	.....	....	0	0	0	0	0	0
	Influenza	50	44	50	43	50	50	100	63	100	60	50	50	50	13	33	17	67	45	67	58	100	100	100	100
	Measles	100	100	50	57	50	50	50	25	50	30	50	50	50	25	0	0	.....	....	0	0	50	13	0	0
	Neuralgia‡	.....	....	50	43	50	13	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	67	58	100	63	100	100
	Pneumonia	100	78	50	57	100	75	100	100	100	80	50	50	50	38	33	8	33	9	67	58	50	50	100	50
	Puerperal Fever	.....	....	0	0	.....	....	0	0	0	0	50	33	.....	....	.....	....	.....	....	0	0	0	0	0	0
	Rheumatism	100	67	100	100	100	100	100	88	50	50	100	100	50	50	67	67	100	100	100	67	50	38	100	100
	Scarlatina	50	56	100	86	100	100	100	100	100	100	100	100	100	100	100	92	67	73	100	75	50	50	100	50

Small-pox	.....	....	0	0	.....	....	0	0	0	0	0	0	.....	....	0	0	.....	....	0	0	0	0	0	0
Tonsilitis‡	.....	....	50	29	50	50	50	25	.....	....	.....	....	50	25	.....	....	.....	....	33	17	50	50	.....	....
Whooping-cough	100	100	50	57	50	50	50	13	0	0	0	0	.....	....	0	0	.....	....	33	8	0	0	0	0
NORTH-WESTERN DIVISION.*																								
Av. for Tabulated Diseases Reported Present ‡	No reports received from this Division for Jan., Feb., March, and April.								100	73	100	80	100	83	100	91	100	77	100	76	63	48	100	81
Bronchitis	.....	....	.....	....	.....	....	.....	....	100	100	100	67	100	33	100	50	100	75	100	80	50	57	100	100
Cerebro-spin'l Meningitis	.....	....	.....	....	.....	....	.....	....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cholera Infantum	.....	....	.....	....	.....	....	.....	....	100	25	100	33	100	100	100	100	100	100	100	20	0	0	0	0
Cholera Morbus	.....	....	.....	....	.....	....	.....	....	100	50	100	67	100	100	100	100	100	75	0	0	0	0	0	0
Consumption, Pulmon'ry	.....	....	.....	....	.....	....	.....	....	100	100	100	100	100	100	100	100	100	100	100	100	50	57	100	100
Croup, Membraneous	.....	....	.....	....	.....	....	.....	....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diphtheria	.....	....	.....	....	.....	....	.....	....	0	0	0	0	0	0	0	0	0	0	0	0	50	43	0	0
Diarrhea	.....	....	.....	....	.....	....	.....	....	100	75	100	100	100	100	100	100	100	100	100	60	0	0	0	0
Dysentery	.....	....	.....	....	.....	....	.....	....	0	0	0	0	100	33	100	100	100	50	0	0	0	0	0	0
Erysipelas	.....	....	.....	....	.....	....	.....	....	100	25	0	0	0	0	0	0	100	25	0	0	50	14	0	0
Fever, Intermittent	.....	....	.....	....	.....	....	.....	....	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	75
Fever, Remittent	.....	....	.....	....	.....	....	.....	....	100	100	100	100	100	100	100	100	100	100	100	100	50	43	100	25
Fever, Typhoid (Enteric)	.....	....	.....	....	.....	....	.....	....	0	0	0	0	0	0	0	0	100	50	100	80	50	29	0	0
Fever, Typho-malarial	.....	....	.....	....	.....	....	.....	....	100	25	0	0	100	67	100	100	100	100	100	60	50	14	0	0
Influenza	.....	....	.....	....	.....	....	.....	....	100	100	100	67	0	0	100	50	0	0	100	60	50	43	100	100
Measles	.....	....	.....	....	.....	....	.....	....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neuralgia ‡	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	0	0	50	43	.....	....
Pneumonia	.....	....	.....	....	.....	....	.....	....	100	100	100	67	0	0	0	0	0	0	0	0	100	57	100	50
Puerperal Fever	.....	....	.....	....	.....	....	.....	....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rheumatism	.....	....	.....	....	.....	....	.....	....	100	100	100	100	100	100	100	100	100	50	100	100	100	86	100	100
Scarlatina	.....	....	.....	....	.....	....	.....	....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small-pox	.....	....	.....	....	.....	....	.....	....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tonsilitis‡	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	100	80	100	57	100	25
Whooping-cough	.....	....	.....	....	.....	....	.....	....	100	50	0	0	0	0	0	0	0	0	100	80	50	29	100	100

TABLE 2.—*Continued.—Diseases in the North-Eastern and the Western Divisions* of the State, by Months in 1878.* (*† *For foot-notes and Full tabular heads, see pages 404–5.*)

Divisions.*	Diseases.	Jan.†		Feb.†		March.†		April.†		May.†		June.†		July.†		Aug.†		Sept.†		Oct.†		Nov.†		Dec.†	
		Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d
North-Eastern Division.*	Av. for Tabulated Diseases Reported Present‡	100	50	100	46	100	54	100	60	100	66	100	70	100	73	100	63	100	61	100	53	100	57	100	58
	Bronchitis	100	100	100	75	100	100	100	100	100	80	100	100	100	40	100	50	100	75	100	80	100	100	100	100
	Cerebro-spi. Meningitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cholera Infantum	0	0	0	0	100	25	0	0	0	0	100	25	100	100	100	100	100	75	0	0	0	0	0	0
	Cholera Morbus	0	0	0	0	0	0	0	0	0	0	0	0	100	80	100	75	0	0	0	0	100	25	0	0
	Consumption, Pulmon'ry	100	20	0	0	100	75	0	0	0	0	0	0	0	0	100	50	100	25	100	20	0	0	100	25
	Croup, Membraneous	0	0	100	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	20	0	0	0	0
	Diphtheria	100	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	20	100	25	0	0
	Diarrhea	0	0	100	25	0	0	100	25	100	60	100	50	100	100	100	100	100	50	100	20	0	0	100	25
	Dysentery	0	0	0	0	0	0	0	0	100	60	100	50	100	80	100	25	0	0	0	0	0	0	0	0
	Erysipelas	100	40	0	0	0	0	0	0	0	0	0	0	0	0	100	25	0	0	100	40	100	100	100	50
	Fever, Intermittent	0	0	0	0	0	0	0	0	100	60	100	75	100	80	100	50	100	50	100	60	100	25	100	25
	Fever, Remittent	0	0	100	25	0	0	0	0	0	0	100	25	100	40	100	50	100	25	0	0	0	0	0	0
	Fever, Typhoid (Enteric)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fever, Typho-malarial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Influenza	0	0	0	0	100	25	100	100	100	100	100	100	100	60	0	0	100	75	100	100	100	100	100	100
	Measles	0	0	0	0	0	0	0	0	100	60	100	100	100	100	100	100	100	75	100	100	100	75	100	50
	Neuralgia‡	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	100	25
	Pneumonia	100	40	100	75	100	25	100	50	0	0	0	0	100	20	0	0	0	0	100	20	100	25	100	75
	Puerperal Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	25	0	0
	Rheumatism	100	80	100	50	100	75	100	25	0	0	100	75	100	80	100	25	0	0	100	60	100	100	100	100
	Scarlatina	0	0	0	0	0	0	0	0	100	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Small-pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
Tonsilitis‡	.....	....	.....	....	100	25	100	25	.....	....	.....	....	.....	....	100	75	100	75	100	40	100	75	100	75
Whooping-cough	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	100	100	100	25	100	25
Av. for Tabulated Diseases Reported Present‡	56	31	56	41	47	34	73	55	52	34	47	32	68	43	59	41	51	42	61	44	59	39	52	39
Bronchitis	100	85	100	81	75	57	67	36	75	53	50	31	75	32	60	35	40	40	60	38	60	39	100	90
Cerebro-spi. Meningitis	25	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	5	0	0	0	0	20	5
Cholera Infantum	25	15	0	0	25	7	0	0	25	16	25	19	50	21	100	65	60	35	40	17	0	0	0	0
Cholera Morbus	0	0	0	0	0	0	0	0	25	5	25	6	50	32	40	35	20	20	40	25	20	11	20	20
Consumption, Pulmon'ry	75	55	50	50	50	43	33	27	25	26	25	25	50	26	40	40	40	40	40	42	40	33	40	40
Croup, Membraneous	25	5	25	13	0	0	0	0	0	0	25	6	0	0	0	0	0	0	0	0	40	11	20	5
Diphtheria	50	25	50	38	25	14	0	0	25	11	25	19	0	0	40	25	40	40	60	42	80	44	20	10
Diarrhea	50	10	50	38	25	14	33	36	25	21	25	25	100	79	100	100	100	65	80	58	80	33	80	45
Dysentery	50	15	25	19	25	7	0	0	25	21	50	31	50	37	100	75	80	50	60	46	40	11	40	15
Erysipelas	75	20	50	25	25	14	33	9	50	11	25	13	0	0	20	5	20	5	40	29	40	33	40	25
Fever, Intermittent	50	25	50	19	50	50	100	73	100	84	100	100	100	79	100	95	100	100	100	83	60	56	100	70
Fever, remittent	100	90	100	94	75	79	100	91	100	84	75	75	100	68	80	65	100	100	100	100	100	83	80	75
Fever, Typhoid (Enteric)	50	15	50	25	0	0	0	0	0	0	0	0	0	0	40	25	20	20	40	29	0	0	20	10
Fever, Typho-malarial	25	10	.....	....	25	7	0	0	25	11	0	0	0	0	40	25	60	45	100	58	20	6	0	0
Influenza	100	50	75	56	75	64	100	91	50	42	50	31	25	21	60	35	60	56	80	58	80	61	60	45
Measles	0	0	25	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	20
Neuralgia‡	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	20	17	20	6	60	40
Pneumonia	50	35	75	69	50	29	100	55	50	42	75	25	75	37	80	40	40	30	40	29	60	33	80	40
Puerperal Fever	0	0	25	13	0	0	0	0	0	0	0	0	0	0	20	5	20	20	20	13	0	0	0	0
Rheumatism	75	40	100	75	100	71	100	73	100	42	75	56	75	37	60	40	80	65	100	63	100	78	100	85
Scarlatina	25	25	50	31	50	50	67	55	75	42	50	13	0	0	20	10	40	25	60	29	80	50	60	60
Small-pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tonsilitis‡	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	40	8	20	6	40	25
Whooping-cough	0	0	0	0	25	7	0	0	0	0	0	0	0	0	60	25	40	35	40	38	40	44	40	40

WESTERN DIVISION.*

TABLE 2.—*Continued.—Diseases in the Central and the Northern-Central Divisions* of the State, by Months in 1878.* (*For foot-notes and Full tabular heads, see pages 404–5.*)

Divisions.*	Diseases.	Jan.†		Feb.†		March.†		April.†		May.†		June.†		July.†		Aug.†		Sept.†		Oct.†		Nov.†		Dec.†	
		Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d
Central Division.*	Av. for Tabulated Diseases Reported Present.‡	43	29	39	29	40	30	39	29	33	23	38	26	41	26	48	36	51	37	51	36	43	33	41	31
	Bronchitis	69	65	62	62	77	69	55	48	64	49	60	38	50	31	67	50	78	56	80	54	60	55	73	68
	Cerebro-spi. Meningitis	0	0	15	4	8	2	9	2	9	4	0	0	0	0	11	3	0	0	0	0	10	8	9	2
	Cholera Infantum	15	3	0	0	8	2	9	7	9	8	10	8	20	10	33	8	44	22	30	17	10	10	9	7
	Cholera Morbus	8	2	8	6	15	10	0	0	9	2	10	8	60	20	33	22	33	11	10	4	0	0	18	5
	Consumption, Pulmon'ry	69	68	69	68	77	73	73	73	73	70	80	77	80	80	78	75	78	78	90	83	80	78	82	78
	Croup, Membraneous	15	8	8	2	8	2	0	0	0	0	0	0	10	2	0	0	0	0	10	4	20	10	9	5
	Diphtheria	38	23	31	26	38	29	27	11	18	17	40	18	50	27	56	44	44	39	50	38	50	40	55	46
	Diarrhea	54	32	46	26	46	29	36	16	18	11	40	15	90	45	89	72	100	81	70	58	40	20	36	17
	Dysentery	8	3	0	0	0	0	9	2	9	2	0	0	40	12	56	22	78	47	60	27	0	0	0	0
	Erysipelas	46	16	23	12	23	8	9	5	9	2	10	8	20	12	22	19	44	14	40	10	30	18	36	20
	Fever, Intermittent	85	60	85	62	85	75	91	86	100	89	90	87	90	88	89	89	89	86	100	90	100	88	73	61
	Fever, Remittent	69	50	46	40	77	55	73	48	55	43	70	46	90	63	78	67	89	83	90	77	80	53	45	37
	Fever, Typhoid (Enteric)	31	16	23	10	15	8	0	0	9	6	20	8	10	2	33	19	0	0	40	17	30	23	27	17
	Fever, Typho-malarial	46	32	31	24	31	22	27	27	27	23	20	13	30	18	33	17	56	31	70	42	21	20	18	13
	Influenza	54	39	46	40	46	35	45	30	45	25	20	15	20	12	0	0	22	14	40	27	50	43	73	49
	Measles	0	0	0	0	8	4	0	0	9	2	10	3	10	4	0	0	0	0	0	0	0	0	0	0
	Neuralgia‡	.....	....	.....	....	.....	....	.....	....	.....	....	10	5	.....	....	.....	....	.....	....	10	2	10	10	27	24
	Pneumonia	69	45	77	48	69	55	64	36	73	34	50	26	40	18	33	19	33	11	40	21	50	35	82	61
	Puerperal Fever	31	11	23	6	23	18	0	0	18	6	0	0	20	8	0	0	11	6	20	10	20	8	18	10
	Rheumatism	77	63	54	56	69	61	64	48	55	43	70	51	50	45	56	31	56	39	60	50	60	40	64	51
	Scarlatina	15	13	31	22	46	24	9	9	27	11	40	33	80	20	22	17	22	14	50	27	30	23	27	17

NORTHERN-CENTRAL DIVISION.*

Small-pox	0	0	0	0	0	0	0	0	0	0	10	5	20	4	0	0	11	3	0	0	0	0	0	0
Tonsilitis‡	15	6	8	2	.....	....	.....	....	9	2	10	3	.....	....	.....	....	.....	....	10	6	20	15	27	22
Whooping-cough	23	10	23	16	23	20	18	14	27	13	30	18	30	27	33	31	33	25	30	23	30	25	27	22
Av. for Tabulated Diseases Reported Present‡	100	73	100	79	100	89	100	83	100	43	100	50	100	43	100	43	100	47	100	40	100	63	100	60
Bronchitis	0	0	0	0	0	0	0	0	100	50	100	25	0	0	.....	....	100	25	100	60	100	100	100	50
Cerebro-spi. Meningitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cholera Infantum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	25	100	25	0	0	0	0	0	0
Cholera Morbus	0	0	0	0	0	0	0	0	0	0	0	0	100	40	100	25	0	0	0	0	0	0	0	0
Consumption, Pulmon'ry	0	0	100	25	0	0	0	0	100	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Croup, Membraneous	100	20	.....	....	0	0	0	0	100	25	0	0	0	0	0	0	0	0	0	0	0	0	100	25
Diphtheria	0	0	0	0	0	0	0	0	100	25	0	0	0	0	0	0	100	50	100	40	0	0	100	100
Diarrhea	100	100	100	100	100	33	100	50	100	50	0	0	100	40	100	25	100	25	0	0	0	0	0	0
Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	100	60	100	100	100	50	100	40	0	0	0	0
Erysipelas	100	100	100	50	100	100	0	0	100	50	0	0	100	20	100	25	0	0	100	40	100	50	100	50
Fever, Intermittent	100	80	100	100	100	100	100	100	100	100	100	100	100	80	100	100	100	100	100	100	100	50	100	50
Fever, Remittent	100	80	100	75	100	100	100	100	100	25	0	0	0	0	100	25	100	50	100	20	0	0	100	25
Fever, Typhoid (Enteric)	0	0	0	0	0	0	0	0	0	0	100	25	0	0	100	50	100	25	100	20	0	0	0	0
Fever, Typho-malarial	100	60	0	0	0	0	0	0	0	0	0	0	100	20	0	0	100	75	100	20	100	25	100	25
Influenza	100	80	100	100	100	100	100	100	100	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Measles	0	0	0	0	0	0	100	50	100	25	0	0	0	0	100	25	0	0	0	0	0	0	0	0
Neuralgia‡	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	0	0	0	0	0	0
Pneumonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	20	100	75	100	100
Puerperal Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rheumatism	100	100	100	100	100	100	100	100	100	75	100	50	100	40	100	25	0	0	0	0	0	0	100	75
Scarlatina	100	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small-pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tonsilitis‡	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	0	0	0	0	100	75
Whooping-cough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	75	100	100

TABLE 2.—*Continued.—Diseases in the Bay and Eastern and the South-Western Divisions* of the State, by Months in 1878. (For foot-notes and Full tabular heads, see pages 404–5.)*

Divisions.*	Diseases.	Jan.†		Feb.†		March.†		April.†		May.†		June.†		July.†		Aug.†		Sept.†		Oct.†		Nov.†		Dec.†	
		Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d
Bay and Eastern Division.*	Av. for Tabulated Diseases Reported Present.‡	45	32	44	33	45	38	52	39	57	43	53	43	62	46	53	45	61	52	64	45	50	40	57	46
	Bronchitis	92	85	91	82	93	92	91	84	78	76	70	76	89	73	70	65	67	64	100	81	90	79	80	82
	Cerebro-Spin'l Meningitis	8	3	0	0	7	2	9	2	22	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cholera Infantum	0	0	9	5	0	0	9	2	0	0	20	8	78	49	80	70	67	50	44	9	10	3	0	0
	Cholera Morbus	8	2	9	5	7	2	18	5	33	9	50	19	78	49	60	54	78	53	11	2	10	3	10	3
	Consumption, Pulmon'ry	83	76	91	89	93	92	91	91	100	100	90	89	80	89	90	76	67	67	67	65	70	64	60	63
	Croup, Membraneous	25	12	9	2	29	21	18	14	33	22	30	14	0	0	10	3	11	8	33	14	40	33	40	21
	Diphtheria	67	39	64	36	43	25	64	44	33	13	20	5	33	13	40	30	44	31	67	40	50	49	80	50
	Diarrhea	42	24	45	20	50	35	45	28	67	53	70	59	89	73	90	92	100	86	89	58	50	36	60	26
	Dysentery	8	2	9	7	7	4	18	7	33	13	50	30	67	49	90	68	89	72	44	23	10	3	0	0
	Erysipelas	42	17	36	25	36	27	27	16	56	27	40	32	56	33	30	30	44	28	56	40	40	28	50	42
	Fever, Intermittent	100	92	91	84	100	90	100	93	100	96	90	95	89	89	100	95	100	100	100	95	100	87	80	84
	Fever, Remittent	75	47	64	48	57	52	73	58	78	64	80	68	67	60	70	68	78	75	78	67	70	51	50	45
	Fever, Typhoid (Enteric)	8	2	18	9	7	2	27	9	11	9	0	0	0	0	10	3	11	3	11	5	0	0	0	0
	Fever, Typho-malarial	25	20	27	16	43	31	73	47	56	31	50	38	44	27	50	41	67	56	78	53	70	49	50	37
	Influenza	58	39	55	43	43	42	64	51	78	56	80	62	89	53	70	49	67	67	89	70	60	59	60	63
	Measles	8	3	9	2	0	0	0	0	0	0	0	0	11	4	10	3	0	0	0	0	10	8	10	11
	Neuralgia‡	17	12	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	11	8	78	56	70	62	70	71
	Pneumonia	83	61	82	66	79	71	91	72	89	69	60	43	56	36	30	30	44	44	78	49	70	46	90	71
	Puerporal Fever	25	7	9	2	7	2	0	0	0	0	10	3	0	0	10	3	0	0	0	0	10	3	0	0
	Rheumatism	83	60	82	77	79	75	91	77	89	80	90	80	89	87	80	76	89	78	100	79	100	85	90	89
	Scarlatina	50	22	55	36	79	56	55	33	56	31	40	30	56	27	40	32	56	42	67	47	50	38	60	18

Small-pox	0	0	0	0	0	0	0	0	0	0	0	0	11	2	0	0	0	0	0	0	0	0	0	0
Tonsilitis‡	8	8	.....	....	.....	....	9	5	.....	....	.....	....	.....	....	.....	....	.....	....	67	37	70	62	70	61
Whooping-cough	8	8	18	9	7	8	18	5	11	4	20	14	22	16	30	19	22	22	33	19	40	31	40	34
Av. for Tabulated Diseases Reported Present‡	45	32	49	35	50	36	48	37	44	31	39	26	40	27	53	35	54	37	54	30	48	34	48	43
Bronchitis	88	74	89	74	67	51	63	46	63	46	44	32	43	21	50	38	63	52	57	38	71	64	57	63
Cerebro-spin'l Meningitis	0	0	11	9	11	3	0	0	13	5	11	3	14	3	0	0	13	3	14	3	0	0	0	0
Cholera Infantum	0	0	11	3	11	3	0	0	0	0	0	0	43	18	50	19	50	21	14	3	0	0	0	0
Cholera Morbus	13	3	22	6	11	3	13	7	0	0	22	6	43	18	38	25	38	17	14	3	0	0	0	0
Consumption, Pulmon'ry	88	74	100	97	100	100	88	93	75	67	67	65	43	42	63	47	75	69	86	74	86	75	86	88
Croup, Membraneous	13	5	22	6	11	6	13	4	13	3	0	0	0	0	0	0	13	3	0	0	29	11	29	31
Diphtheria	38	18	33	11	33	11	50	21	25	13	33	15	14	15	13	6	50	21	14	12	43	25	57	50
Diarrhea	38	13	22	11	44	23	38	11	38	13	22	6	86	67	100	75	100	76	14	15	57	18	14	8
Dysentery	13	5	11	6	0	0	0	0	13	3	11	6	43	9	88	56	63	45	14	9	0	0	0	0
Erysipelas	13	13	56	29	22	23	38	25	25	5	22	18	0	0	38	16	13	3	43	24	29	25	29	31
Fever, Intermittent	100	74	100	74	100	74	88	79	100	100	100	91	100	100	100	100	100	97	100	88	100	89	86	73
Fever, Remittent	100	63	78	63	78	51	38	18	50	28	67	41	71	55	88	63	75	72	71	62	57	39	29	31
Fever, Typhoid (Enteric)	13	11	11	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	18	14	4	14	12
Fever, Typho-malarial	25	18	22	9	22	9	25	18	0	0	22	9	14	9	38	16	50	34	57	44	43	32	29	19
Influenza	75	53	78	66	78	57	63	57	50	36	22	18	29	12	38	13	50	41	71	44	43	43	57	50
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	6	0	0	0	0	0	0	0	0
Neuralgia‡	13	11	22	9	11	3	13	4	25	15	11	9	29	12	13	3	13	3	14	15	29	25	14	4
Pneumonia	75	55	100	86	78	66	63	54	63	41	56	32	14	3	13	3	0	0	29	6	14	4	29	19
Puerperal Fever	13	8	0	0	11	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rheumatism	88	87	89	86	100	89	100	93	88	85	89	59	57	36	63	47	75	55	100	76	71	71	100	92
Scarlatina	13	3	56	20	67	34	38	25	13	8	11	6	14	6	0	0	13	7	43	15	43	11	57	38
Small-pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	4	0	0
Tonsilitis‡	.....	....	.....	....	11	9	13	4	13	3	0	0	.....	....	25	6	13	14	43	24	43	36	71	38
Whooping-cough	13	3	11	3	0	0	13	7	38	21	22	18	14	12	0	0	13	10	14	15	0	0	0	0

SOUTH-WESTERN DIVISION.*

TABLE 2.—*Continued.—Diseases in the Southern-Central and the South-Eastern Divisions* of the State, by Months in 1878. (For footnotes and Full tabular heads, see pages 404–5.)*

Divisions.*	Diseases.	Jan.†		Feb.†		March.†		April.†		May.†		June.†		July.†		Aug.†		Sept.†		Oct.†		Nov.†		Dec.†	
		Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d	Per cent of Observers Reporting Presence of.b	Per ct. of Reports Stating Pres. of.d
Southern-Central Division.*	Av. for Tabulated Diseases Reported Present.‡	43	33	43	33	39	32	39	31	39	29	33	25	43	31	42	33	47	35	47	34	51	40	46	37
	Bronchitis	82	83	94	88	94	90	100	92	77	68	62	56	57	38	53	41	59	47	73	58	86	80	93	84
	Cerebro-spin'l Meningitis	6	1	0	0	0	0	0	0	8	8	15	6	7	1	6	3	12	3	20	6	14	5	7	7
	Cholera Infantum	0	0	0	0	0	0	6	2	0	0	8	2	29	10	47	30	59	30	13	4	0	0	0	0
	Cholera Morbus	12	4	18	6	11	4	6	7	15	9	31	13	57	30	59	52	65	33	13	11	0	0	7	2
	Consumption, Pulmon'ry	76	70	76	67	78	69	81	67	92	71	69	65	71	70	65	64	82	68	87	81	86	86	87	70
	Croup, Membraneous	18	6	6	1	6	3	13	5	0	0	8	2	0	0	0	0	6	2	20	7	29	11	20	16
	Diphtheria	35	20	24	16	39	24	38	20	23	5	8	8	21	14	12	8	6	6	40	25	43	30	47	26
	Diarrhea	29	23	29	22	33	22	19	17	31	20	31	19	71	55	88	82	94	80	53	31	21	11	13	9
	Dysentery	12	7	6	4	11	4	13	8	15	9	8	8	21	12	47	29	59	33	27	10	0	0	7	2
	Erysipelas	53	21	35	16	22	13	25	18	15	9	23	12	21	14	29	15	12	12	27	15	29	18	13	9
	Fever, Intermittent	88	76	94	72	83	76	100	92	100	97	100	98	100	97	100	98	100	100	100	99	93	89	80	70
	Fever, Remittent	82	61	65	51	61	48	63	40	69	48	69	60	86	67	88	82	88	85	93	81	79	66	67	60
	Fever, Typhoid (Enteric)	6	1	0	0	6	3	6	2	8	2	0	0	7	6	6	2	24	17	13	6	0	0	0	0
	Fever, Typho-malarial	41	22	24	18	11	4	6	3	0	0	15	4	29	9	29	17	59	42	67	50	29	16	13	11
	Influenza	53	38	47	42	56	48	44	40	46	34	23	23	29	19	29	18	47	30	40	24	57	38	53	44
	Measles	0	0	0	0	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Neuralgia‡	12	9	6	4	17	9	19	12	15	11	15	10	7	7	6	6	12	8	27	15	50	34	53	39
	Pneumonia	65	55	65	52	67	64	69	57	46	22	38	23	43	19	12	8	18	9	40	21	64	48	73	56
	Puerperal Fever	0	0	6	1	0	0	0	0	8	2	8	6	0	0	12	3	6	2	0	0	7	2	0	0
	Rheumatism	88	82	82	76	89	78	88	78	77	62	77	56	71	61	65	50	71	53	73	56	79	66	87	75
	Scarlatina	29	24	53	22	28	13	13	5	8	0	15	8	14	9	29	16	35	23	27	19	29	18	53	32

Small-pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tonsilitis‡	12	10	6	6	11	10	19	13	8	8	8	8	7	6	12	6	18	8	40	26	57	43	67	40
Whooping-cough	6	4	6	1	6	6	6	7	23	18	15	6	36	20	24	21	35	27	67	43	71	63	60	58
Av. for Tabulated Diseases Reported Present.‡	49	40	50	39	52	41	52	44	53	43	51	41	54	44	51	44	60	50	60	48	59	48	63	52
Bronchitis	93	85	77	71	91	70	90	85	100	81	80	78	60	47	45	50	56	56	78	64	89	89	100	94
Cerebro-spin'l Meningitis	13	10	15	4	9	2	0	0	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cholera Infantum	7	4	15	13	18	7	0	0	0	0	20	8	50	43	64	48	56	44	22	13	0	0	0	0
Cholera Morbus	0	0	38	17	27	23	30	8	0	0	20	13	60	41	82	58	67	35	33	22	11	3	0	0
Consumption, Pulmon'ry	80	70	77	69	82	73	90	90	90	83	80	75	80	82	73	75	89	88	89	84	89	86	89	81
Croup, Membraneous	33	19	23	19	18	18	40	23	10	6	10	3	0	0	0	0	0	0	0	0	33	14	33	25
Diphtheria	80	53	62	31	55	32	40	26	30	29	30	18	10	2	9	3	11	3	56	20	56	39	67	58
Diarrhea	33	29	62	48	82	61	50	46	60	52	70	55	90	71	100	88	100	82	78	69	56	39	44	36
Dysentery	27	18	23	15	36	30	30	31	30	31	40	35	70	47	64	63	78	65	67	44	56	39	44	22
Erysipelas	47	34	46	31	55	41	50	49	60	44	30	28	40	27	36	28	22	21	44	36	56	36	44	44
Fever, Intermittent	93	75	77	67	91	77	100	85	100	96	100	100	100	98	100	95	100	97	100	98	100	78	78	67
Fever, Remittent	47	45	62	56	73	50	50	41	60	44	70	53	80	73	82	70	89	82	89	80	78	61	56	44
Fever, Typhoid (Enteric)	33	30	23	23	36	25	20	13	20	13	40	25	30	16	18	18	44	24	56	31	33	33	44	36
Fever, Typho-malarial	33	26	31	27	36	27	40	31	40	27	40	30	40	39	64	45	89	74	89	64	56	53	56	36
Influenza	87	79	92	75	91	80	90	85	80	77	90	65	60	45	45	45	67	41	56	38	89	61	100	83
Measles	7	7	15	10	9	9	10	10	10	10	10	10	20	14	9	10	11	9	11	11	22	17	33	19
Neuralgia‡	7	7	8	6	9	9	10	5	.....	....	.....	....	.....	....	.....	....	.....	....	33	18	44	31	44	31
Pneumonia	73	62	69	63	82	66	70	59	90	65	80	50	30	24	27	30	33	32	56	40	67	50	89	58
Puerperal Fever	7	1	0	0	9	2	10	3	20	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rheumatism	100	86	92	81	100	89	90	85	100	83	80	70	90	57	55	50	78	74	78	78	89	78	89	83
Scarlatina	53	37	62	44	55	45	40	38	40	29	20	20	20	20	27	25	44	32	33	33	44	36	67	53
Small-pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	3	0	0	0	0	0	0	0	0
Tonsilitis‡	13	12	8	8	.....	....	10	3	.....	....	.....	....	.....	....	.....	....	.....	....	33	15	44	31	67	44
Whooping-cough	40	36	38	27	36	30	40	38	50	42	50	35	40	41	55	43	56	47	56	44	44	44	44	44

South-Eastern Division.*

EXHIBIT 31.—*By Months and by Geographical Divisions of the State, the Names of Observers whose Weekly Reports of Diseases are Compiled in the following Tables, the Localities* for which they Report, and the Number of Reports received from each Observer.*

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED. (Health Officers in italics; those also Correspondents marked with a *.)	WEEKLY REPORTS—COMPILED ON PAGES 404-469.											
	YEAR 1878.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
ALL LOCALITIES	3,221	353	275	274	241	292	235	285	255	244	293	240	234
UPPER-PENINSULAR DIVISION †	103	9	7	8	8	10	6	8	12	11	12	8	4
Calumet, Charles W. Niles, M. D.	41	5	4	4	4	5	3	4	4	4	4		
Houghton, H. W. Jones, M. D.	48	4	3	4	4	5	3	4	4	4	5	4	4
Ishpeming, *W. T. Carpenter,* M. D.*	14								4	3	3	4	
NORTH-WESTERN DIVISION †	34					4	3	3	4	4	5	7	4
Cadillac, *J. M. Wardell, M. D.*	3											3	
Manistee, *John Kinsley, M. D.*	31					4	3	3	4	4	5	4	4
NORTH-EASTERN DIVISION †	52	5	4	4	4	5	4	5	4	4	5	4	4
Alpena, Wm. P. Maiden, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
WESTERN DIVISION †	217	20	16	14	11	19	16	19	20	20	24	18	20
Coopersville, J. C. McIlvain, M. D.	11	5	4	2									
Grand Haven, *A. Vander Veen, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Grand Rapids, A. Hazlewood, M. D.	50	5	4	4	3	5	4	4	4	4	5	4	4
Holland, *Bernardus Ledeboer, M. D.*	51	5	4	4	4	5	4	5	4	4	4	4	4
Ludington, *A. P. McConnell, M. D.*	34					4	4	5	4	4	5	4	4
Muskegon, *Oliver C. Williams, M. D.*	19								4	4	5	2	4
CENTRAL DIVISION †	549	62	50	51	44	53	39	49	36	36	48	40	41
Charlotte, *G. B. Allen,* M. D.*	52	‡10	‡8	‡8	4	4	3	4			4	4	3
DeWitt, Geo. W. Topping, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Elsie, E. V. Chase, M. D.	51	5	4	4	4	5	4	5	4	4	5	4	3
Flint, *J. B. F. Curtis, M. D.*	3												3
Flint, H. P. Seymour, M. D.	4	4											
Hastings, A. P. Drake, M. D.	49	3	4	4	4	5	4	5	4	4	4	4	4
Howell, C. V. Beebe, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Hubbardston, H. W. Browne, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Ionia, *S. V. Romig, M. D.*	45		2	4	4	5	4	5	4	4	5	4	4
Lansing, J. B. Hull, M. D.	20	5	4	3	4	4							
Mason, *H. Henry Cook, M. D.*	13	5	4	4									
North Lansing, O. Marshall, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Otisville, A. W. Nicholson, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Ovid, O. B. Campbell, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
NORTHERN-CENTRAL DIVISION †	50	5	4	3	4	4	4	5	4	4	5	4	4
Big Rapids, *J. W. Badger, M. D.*	29						3	5	4	4	5	4	4
Big Rapids, *W. S. Whitney, M. D.*	21	5	4	3	4	4	1						
BAY AND EASTERN DIVISION †	514	59	44	48	43	45	37	45	37	36	43	39	38
Bay City, W. H. Burr, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Bay City, W. R. Marsh, M. D.	51	5	4	4	4	5	4	5	4	4	4	4	4
Bay City, *W. R. McCormick*	5											3	2
East Saginaw, N. H. Claflin, M. D.	22	5	4	4	4	5							
East Saginaw, S. Kitchen, M. D.	16	5	4	4	3								
East Saginaw, *M. J. Liddell, M. D.*	25	5	4	4	4	5	3						
Lapeer, *Hugh McColl, M. D.*	6	4		2									
Lapeer, Alfred Nash, M. D.	41			3	4	5	4	5	3	4	5	4	4
Lexington, A. M. Oldfield, M. D.	12	5	4	3									
Port Huron, H. R. Mills, M. D.	11	5	4	2									
Port Huron, *S. W. Smith, M. D.*	30						4	5	4	4	5	4	4
Port Huron, *A. A. Whitney, M. D.*	33	5	4	4	4	5	4	5	2				
Port Sanilac, J. M. Loop, M. D.	32				4		2	5	4	4	5	4	4
Saginaw City, N. D. Lee, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Saginaw City, *I. N. Smith, M. D.*	46		4	4	4	5	4	5	4	4	4	4	4
Saint Clair, *C. G. Robertson, M. D.*	7	5		2									
Thornville, John S. Caulkins, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
West Bay City, *John W. Hauxhurst, M. D.*	21								4	4	5	4	4
SOUTH-WESTERN DIVISION †	391	38	35	35	28	39	34	33	32	29	34	28	26
Allegan, H. S. Lay, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Dowagiac, *H. S. McMaster, M. D.*	13	5	4	4									
Dowagiac, *C. W. Morse, M. D.*	35				2	4	4	5	4	4	5	4	3
Mattawan, Thos. H. Briggs, M. D.	29	3	3	3	3		3		4	3	4		3
New Troy, L. H. Dunning, M. D.	15					5	3	3	4				
New Troy, Geo. H. Riley, M. D.	4											4	
Niles, Simeon Belknap, M. D.	13	5	4	4									
Niles, *Oliver P. Horn, M. D.*	38		4	4	4	5	4			4	5	4	4
Niles, James S. Reeves, M. D.	51	5	4	4	3	5	4	5	4	4	5	4	4

* Health officers of cities are supposed to report for their cities only; the reports of other observers are not thus restricted in locality, but in many cases include the vicinity as well as the corporate limits of the place named.

* Health Officer and Correspondent. † For counties in each division, see Exhibit 1, page 153.

‡ Reports for Charlotte and vicinity; but also in January, February, and March makes a separate report, as health officer, for the city only.

EXHIBIT 31.—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED. (Health Officers in italics; those also Correspondents marked with a *.)	WEEKLY REPORTS—COMPILED ON PAGES 404–469.											
	YEAR 1878.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
S. W. DIVISION.†—*Continued:*													
Otsego, Milton Chase, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Paw Paw, Josiah Andrews, M. D.	37	5	4	4	4	5	4	5	4	2	----	----	----
St. Joseph, R. F. Stratton, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
SOUTHERN-CENTRAL DIVISION †	779	82	67	67	60	65	52	69	66	66	72	56	57
Adrian, Robert Stephenson, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Albion, John P. Stoddard, M. D.	48	5	3	2	4	5	4	5	3	4	5	4	4
Ann Arbor, W. F. Breakey, M. D.	15	5	4	4	2	----	----	----	----	----	----	----	----
Ann Arbor, *John Kapp, M. D.*	8	----	----	----	----	----	----	----	4	4	----	----	----
Battle Creek, *& & French,** *M. D.*	8	----	----	----	----	----	----	----	4	4	----	----	----
Brooklyn, E. N. Palmer, M. D.	50	3	4	4	4	5	4	5	4	4	5	4	4
Clinton, A. W. Alvord, M. D.	39	4	4	3	2	----	----	5	4	4	5	4	4
Coldwater, *Louis H. Wurtz,** *M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Hillsdale, *Alonzo Cressy, M. D.*	12	----	----	----	----	----	----	----	3	3	4	----	2
Hudson, A. R. Smart, M. D.	13	5	4	4	----	----	----	----	----	----	----	----	----
Jackson (State Prison), Edwin L. Kimball, M. D.	51	5	4	4	4	5	4	5	4	4	5	4	3
Jackson, Wm. Worsfold, M. D.	43	----	----	4	4	5	4	5	4	4	5	4	4
Kalamazoo, W. B. Southard, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Marshall, *Henry L. Joy,** *M. D.*	49	5	4	4	4	5	4	5	4	3	3	4	4
Mendon, H. C. Clapp, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Mendon, Edwin Stewart, M. D.	51	5	4	4	4	5	4	4	4	4	5	4	4
Sturgis, Nelson I. Packard, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Tecumseh, C. M. Woodward, M. D.	11	5	4	2	----	----	----	----	----	----	----	----	----
Three Rivers, C. W. Backus, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
York, F. M. Oakley, M. D.	17	5	4	4	4	----	----	----	----	----	----	----	----
Ypsilanti, *Edward Batwell,** *M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
SOUTH-EASTERN DIVISION †	532	73	48	44	39	48	40	49	40	34	45	36	36
Dearborn, E. S. Snow, M. D.	13	5	4	4	----	----	----	----	----	----	----	----	----
Detroit, Leartus Connor, M. D.	51	5	4	4	4	5	4	5	4	3	5	4	4
Detroit, *Elisha Leach, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Detroit, W. H. Rouse, M. D.	51	5	3	4	4	5	4	5	4	4	5	4	4
Milford, Robert Johnston, M. D.	51	5	4	4	4	5	4	4	4	4	5	4	4
Monroe, *Edward Dorsch, M. D.*	13	5	4	4	----	----	----	----	----	----	----	----	----
Monroe, *Peter Soans, M. D.*	4	----	----	----	----	----	----	----	4	----	----	----	----
Monroe, Wm. C. West, M. D.	4	4	----	----	----	----	----	----	----	----	----	----	----
Northville, J. M. Swift, M. D.	46	5	4	4	4	5	4	5	2	----	5	4	4
Plymouth, Willard Chaney, M. D.	8	5	3	----	----	----	----	----	----	----	----	----	----
Pontiac, W. G. Elliott, M. D.	29	5	4	4	4	3	4	5	----	----	----	----	----
Pontiac, *Robert LeBaron,** *M. D.*	5	5	----	----	----	----	----	----	----	----	----	----	----
Utica, Wm. Brownell, M. D.	4	4	----	----	----	----	----	----	----	----	----	----	----
Utica, George G. Roberson, M. D.	47	----	4	4	4	5	4	5	4	4	5	4	4
Walled Lake, E. A. Chapman, M. D.	38	5	4	4	4	5	4	5	4	3	----	----	----
Washington, Albert Yates, M. D.	38	----	----	----	3	5	4	5	4	4	5	4	4
Wyandotte, E. P. Christian, M. D.	52	5	4	4	4	5	4	5	4	4	5	4	4
Wyandotte, *T. J. Langlois, M. D.*	26	5	2	----	----	----	----	----	2	4	5	4	4

* Health Officer and Correspondent. † For counties in each division, see Exhibit 1, page 153.

Table 3, pages 422–469, has been compiled directly from the card-reports. It gives for each *locality* from which reports were received a general idea of the diseases which occurred each month. For want of room on the page the names of observers are omitted from this table; but when there was more than one observer at a place during the year the initials of both are given. The names of observers and their postoffice addresses are given in Exhibit 31, above, which also states the number of reports received from each observer each month. Except in the case of health officers of cities, who are supposed to report only for the territory within their city limits, the localities for which the reports are made include more or less of the *vicinity* of places named. For want of room on the same pages with the table some of the side-notes, containing statements by observers, or summaries of such statements, relative to diseases reported, are printed on the pages immediately following the table. Other comments on Table 3 are given on pages 399 and 403, and in the foot-notes to the table. Tables 1 and 2 were made from Table 3.

TABLE 3.—*Exhibiting by Localities, and by Months of the Year ending* **December** *28, 1878, Facts relative to the Occurrence and Order of Prevalence of Diseases in Michigan, as compiled from 3,221 Weekly Reports made by Health Officers of Cities and by Regular Correspondents of the State Board of Health,—stating for each Disease the Per Cent of Weeks it was reported Present where Present, and Its Average Order of Prevalence when Present, thus indicating the Prevalence as regards Time, and also as regards Area so far as this is represented by the localities. For the Five Weeks ending* **February** *2, 1878.*

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were during the year, two or more observers at one place, their initals are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.	
		Per ct. of Weeks Present.++	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.++	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.++	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.++	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.++	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.++	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.++	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.++	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.++	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.++	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.++	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.++	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.++	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.++	Av. Ord. of Prev when Present.§
ALL LOCALITIES‖	353	92	2.9	44	5.2	42	5.3	24	4.8	88	5.0	45	5.6	58	4.9	63	5.0	49	6.7	49	5.4	80	2.6	75	3.0	59	5.6	66	5.2
UPPER-PENIN. DIVISION.†	*9*	*100*	*4*	----	----	----	----	----	----	*75*	*6*	----	----	----	----	*100*	*5*	*40*	*6*	*60*	*7*	----	----	*100*	*1*	----	----	----	----
Calumet	5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100	5	40	6	60	7	----	----	100	1	----	----	----	----
Houghton	4	100	4	----	----	----	----	----	----	75	6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
NORTH-EASTERN DIV.†	*5*	*100*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*20*	*3*	*0*	*0*	*20*	*2*	*0*	*0*	*0*	*0*	*40*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Alpena	5	100	1	0	0	0	0	0	0	20	3	0	0	20	2	0	0	0	0	40	3	0	0	0	0	0	0	0	0
WESTERN DIVISION.†	*20*	*85*	*3*	*20*	*6*	*60*	*4*	*0*	*0*	*73*	*3*	*20*	*3*	*50*	*4*	*20*	*5*	*30*	*5*	*27*	*4*	*50*	*4*	*90*	*2*	*30*	*6*	*40*	*6*
Coopersville	5	100	2	----	----	----	----	----	----	100	2	----	----	----	----	20	4	20	5	20	5	40	4	60	3	40	4	----	----
Grand Haven	5	100	2	0	0	60	4	0	0	0	0	0	0	60	4	0	0	40	4	20	5	0	0	100	2	20	7	40	6
Grand Rapids	5	100	5	20	6	0	0	0	0	100	5	0	0	0	0	20	6	0	0	0	0	60	4	100	1	0	0	0	0
Holland	5	40	3	0	0	0	0	0	0	20	3	20	3	40	3	0	0	0	0	40	3	0	0	100	1	0	0	0	0
CENTRAL DIVISION.†	*62*	*91*	*2*	*0*	*0*	*22*	*6*	*20*	*4*	*100*	*5*	*56*	*5*	*58*	*5*	*59*	*3*	*50*	*5*	*34*	*5*	*71*	*2*	*70*	*4*	*50*	*6*	*67*	*5*
Charlotte (City)	5	100	2	0	0	0	0	0	0	100	9	0	0	0	0	100	3	0	0	0	0	100	4	100	6	40	8	100	7
Charlotte	5	100	2	0	0	20	9	0	0	100	11	0	0	20	10	100	3	0	0	20	10	100	5	100	6	100	9	100	7
DeWitt	5	100	1	0	0	0	0	0	0	100	3	0	0	0	0	80	3	0	0	40	4	20	3	40	4	0	0	0	0
Elsie	5	0	0	0	0	0	0	0	0	0	0	0	0	60	4	0	0	0	0	20	4	60	3	60	3	0	0	100	2
Flint—H. P. S.	4	100	4	----	----	25	3	----	----	100	4	50	7	100	2	75	4	50	5	100	5	75	3	50	4	----	----	----	----
Hastings	3	0	0	0	0	0	0	----	----	100	4	0	0	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0
Howell	5	100	4	0	0	0	0	0	0	100	4	0	0	20	6	0	0	0	0	0	0	0	0	0	0	0	0	20	7
Hubbardston	5	----	----	----	----	----	----	----	----	100	2	----	----	----	----	20	2	----	----	----	----	20	1	----	----	----	----	----	----
Lansing	5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	80	1	60	1	----	----	----	----
Mason	5	100	2	0	0	0	0	20	4	0	0	60	3	0	0	20	3	0	0	20	4	100	1	100	2	40	4	40	3
North Lansing	5	80	3	0	0	0	0	0	0	100	2	0	0	0	0	20	5	0	0	20	4	100	1	20	5	20	2	40	5
Otisville	5	80	2	0	0	0	0	0	0	100	3	0	0	100	2	0	0	0	0	0	0	40	2	0	0	0	0	0	0
Ovid	5	60	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0
NORTHERN-CENTRAL DIV.†	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*20*	*8*	*0*	*0*	*100*	*5*	*0*	*0*	*100*	*1*	*80*	*3*	*80*	*2*	*0*	*0*	*60*	*3*
Big Rapids—*W. & W.*	5	0	0	0	0	0	0	0	0	0	0	20	8	0	0	100	5	0	0	100	5	80	3	80	2	0	0	60	3
BAY AND EASTERN DIV.†	*59*	*93*	*3*	*40*	*7*	*0*	*0*	*20*	*3*	*90*	*6*	*50*	*5*	*59*	*5*	*56*	*6*	*20*	*10*	*40*	*6*	*92*	*2*	*64*	*3*	*20*	*6*	*86*	*5*
Bay City—W. H. B.	5	100	6	0	0	0	0	0	0	100	5	0	0	40	7	0	0	0	0	0	0	100	1	100	2	0	0	0	0
Bay City—W. R. M.	5	100	5	0	0	0	0	0	0	100	9	60	6	100	9	100	7	0	0	20	11	100	1	100	4	0	0	100	10
East Saginaw—N. H. C.	5	100	2	0	0	0	0	0	0	100	8	0	0	100	4	0	0	0	0	0	0	100	1	0	0	0	0	0	0
East Saginaw—S. K.	5	100	2	0	0	0	0	0	0	100	8	----	----	60	7	80	9	20	10	40	11	100	4	80	4	0	0	0	0
East Saginaw—*M. J. L.*	5	100	3	0	0	0	0	20	3	40	4	0	0	40	1	20	4	0	0	0	0	40	2	20	3	0	0	0	0

Lapeer—*H. McC.*	4	100	2	0	0	0	0	0	0	0	0	50	5	25	5	0	0	0	0	0	0	100	2	75	3	0	0	75	4
Lexington	5	20	2	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	80	3	80	2	100	2	0	0	0	0
Port Huron—H. R. M.	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	1	80	2	20	1	0	0	0	0
Port Huron—*A. A. W.*	5	100	1	0	0	0	0	0	0	100	4	40	5	40	5	0	0	0	0	0	0	100	3	20	4	20	6	0	0
Saginaw City—N. D. L.	5	100	4	40	7	0	0	0	0	80	6	0	0	60	5	0	0	0	0	40	4	100	1	0	0	0	0	0	0
St. Clair	5	100	4	0	0	0	0	0	0	80	5	0	0	0	0	60	3	0	0	0	0	100	1	60	1	0	0	0	0
Thornville	5	100	3	0	0	0	0	0	0	100	6	0	0	0	0	20	7	0	0	0	0	100	2	0	0	0	0	80	2
SOUTH-WESTERN DIV.†	*38*	*85*	*3*	*0*	*0*	*0*	*0*	*20*	*5*	*85*	*4*	*40*	*6*	*47*	*4*	*33*	*4*	*40*	*3*	*100*	*8*	*74*	*3*	*63*	*3*	*80*	*7*	*70*	*4*
Allegan	5	100	1	0	0	0	0	20	5	0	0	0	0	60	3	40	5	0	0	0	0	60	3	20	3	0	0	0	0
Dowagiac—*H. & McM.*	5	80	6	0	0	0	0	0	0	100	6	0	0	0	0	20	5	0	0	0	0	100	2	100	1	0	0	100	5
Mattawan	3	67	3	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	33	2	100	1	0	0	0	0
Niles—S. B.	5	100	6	0	0	0	0	0	0	100	6	0	0	40	6	0	0	0	0	100	8	100	5	100	4	80	7	0	0
Niles—J. S. R.	5	100	4	0	0	0	0	0	0	80	5	40	6	40	4	0	0	0	0	0	0	60	3	40	4	0	0	0	0
Otsego	5	60	3	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	80	2	40	2	0	0	0	0
Paw Paw	5	0	0	0	0	0	0	0	0	100	3	0	0	0	0	40	3	40	3	0	0	40	2	60	2	0	0	40	3
St. Joseph	5	80	1	0	0	0	0	0	0	20	4	0	0	0	0	0	0	0	0	0	0	100	2	60	3	0	0	0	0
SOUTHERN-CENTRAL DIV.†	*82*	*90*	*2*	*20*	*6*	*0*	*0*	*30*	*6*	*89*	*5*	*36*	*4*	*55*	*4*	*76*	*5*	*60*	*5*	*39*	*4*	*83*	*3*	*75*	*3*	*20*	*3*	*53*	*5*
Adrian	5	80	2	0	0	0	0	0	0	100	2	40	2	60	3	40	2	0	0	20	2	40	2	60	2	0	0	0	0
Albion	5	100	2	0	0	0	0	20	8	100	3	0	0	20	2	80	6	80	6	100	4	100	2	100	3	0	0	0	0
Ann Arbor—W. F. B.	5	100	2	0	0	0	0	0	0	100	8	0	0	0	0	60	6	0	0	0	0	100	4	100	5	0	0	60	6
Brooklyn	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	1	0	0	0	0
Clinton	4	100	3	0	0	0	0	0	0	100	9	50	7	75	4	0	0	0	0	50	8	0	0	100	4	0	0	100	8
Coldwater	5	100	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	3	80	3	0	0	0	0
Hudson	5	100	3	0	0	0	0	40	4	0	0	0	0	0	0	100	4	40	4	0	0	100	4	100	3	0	0	40	3
Jackson (State Prison)	5	100	1	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	40	6	100	2	0	0	0	0	0	0
Kalamazoo	5	0	0	0	0	0	0	0	0	100	6	0	0	100	4	0	0	0	0	0	0	100	1	100	2	0	0	60	4
Marshall	5	100		0	0	0	0	0	0	80	7	0	0	0	0	0	0	0	0	0	0	80	5	60	5	0	0	0	0
Mendon—H. C. C.	5	100	2	0	0	0	0	0	0	60	6	0	0	0	0	0	0	0	0	0	0	100	4	100	5	0	0	40	6
Mendon—E. S.	5	100		0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	60	3	80	2	0	0	40	3
Sturgis	5	100		0	0	0	0	0	0	100	3	20	4	0	0	0	0	0	0	20	3	20	1	40	4	0	0	0	0
Tecumseh	5	100	2	----	----	----	----	----	----	40	3	----	----	----	----	----	----	----	----	40	3	100	2	----	----	----	----	----	----
Three Rivers	5	100	5	20	6	0	0	0	0	80	8	0	0	0	0	100	6	0	0	20	6	100	3	40	6	0	0	0	0
York	5	100	2	0	0	0	0	0	0	100	1	0	0	40	2	0	0	0	0	40	2	100	1	40	2	20	3	0	0
Ypsilanti	5	0	0	0	0	0	0	0	0	0	0	0	0	40	2	0	0	0	0	20	3	100	2	0	0	0	0	40	3
SOUTH EASTERN DIV.†	*73*	*91*	*3*	*70*	*4*	*60*	*5*	*0*	*0*	*88*	*6*	*56*	*7*	*67*	*6*	*84*	*7*	*65*	*9*	*73*	*8*	*80*	*3*	*97*	*3*	*92*	*6*	*76*	*7*
Dearborn	5	40	4	80	3	0	0	0	0	0	0	40	2	0	0	0	0	0	0	0	0	60	3	0	0	0	0	40	3
Detroit—L. C.	5	100	2	0	0	0	0	0	0	100	7	0	0	20	13	100	11	100	13	100	10	100	3	100	9	0	0	100	10
Detroit—*E. L.*	5	100	9	0	0	0	0	0	0	100	10	0	0	100	7	0	0	40	8	100	8	100	6	100	2	0	0	40	13
Detroit—W. H. R.	5	100	3	0	0	0	0	0	0	100	7	100	15	100	7	100	11	80	13	100	13	100	8	100	5	100	13	0	0
Milford	5	100	3	0	0	0	0	0	0	0	0	0	0	60	4	0	0	0	0	0	0	100	1	0	0	0	0	0	0
Monroe—*E. D.*	5	100	3	0	0	60	5	0	0	100	4	100	5	100	2	100	6	0	0	60	5	100	1	100	2	100	3	100	4
Monroe—W. C. W.	4	100	3	0	0	0	0	0	0	25		0	0	50	5	0	0	0	0	25	5	100	1	75	2	50	4	0	0
Northville	5	60	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	2	0	0	0	0	0	0
Plymouth	5	80	2	0	0	0	0	0	0	20	2	0	0	0	0	0	0	0	0	0	0	20	4	0	0	0	0	0	0
Pontiac—W. G. E.	5	100		60	4	0	0	0	0	100	6	0	0	80	5	100	3	0	0	0	0	100	4	0	0	100	5	0	0
Pontiac—*R. LeB.*	5	100	6	0	0	0	0	0	0	100	8	20	8	100	5	0	0	0	0	60	8	100	1	100	1	100	4	100	3
Utica—W. B.	4	100	6	0	0	0	0	0	0	100	6	0	0	25	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walled Lake	5	0	0	0	0	0	0	0	0	100	4	20	4	80	4	0	0	0	0	60	5	100	1	100	2	0	0	0	0
Wyandotte—E. P. C.	5	100		0	0	0	0	0	0	100	3	0	0	40	3	0	0	40	3	0	0	40	2	0	0	0	0	0	0
Wyandotte—*T. J. L.*	5	100		0	0	0	0	0	0	100	5	0	0	40	7	20	4	0	0	0	0	60	4	----	----	0	0	----	----

*, †, ‡, §, ||. For explanations and references, see foot-notes on pages 425, 429; for comments, see pages 399, 403, 421; for names of observers see Exhibit 31, pages 420–1. A summary of statements in this table is given on pages 404–419.

TABLE 3.—*Diseases, by Localities in Michigan, Five Weeks ending* **February** *2, 1878*—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Influenza		Measles.		Neuralgia.¶		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Smallpox.		Tonsilitis.¶		Whooping-cough.	
		Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§
ALL LOCALITIE ‖..	353	75	2.5	84	4.8	77	3.0	79	4.1	35	4.4	86	3.6	67	4.9	0	0	79	3.1	77	4.5
UPPER-PENINSULAR DIV.	*9*	*100*	*2*	*100*	*3*	----	----	*78*	*5*	----	----	*67*	*6*	*100*	*5*	----	----	----	----	*100*	*3*
Calumet	5	----	----	100	3	----	----	80	7	----	----	100	5	100	5	----	----	----	----	100	3
Houghton *a*	4	100	2	100	3	----	----	75	3	----	----	25	7	----	----	----	----	----	----	100	3
NORTH-EASTERN DIV	*5*	*0*	*0*	*0*	*0*	----	----	*40*	*2*	*0*	*0*	*80*	*3*	*0*	*0*	*0*	*0*	----	----	*0*	*0*
Alpena *b*	5	0	0	0	0	----	----	40	2	0	0	80	3	0	0	0	0	----	----	0	0
WESTERN DIVISION.†	*20*	*60*	*2*	*0*	*0*	----	----	*70*	*4*	*0*	*0*	*53*	*5*	*100*	*6*	*0*	*0*	----	----	*0*	*0*
Coopersville	5	40	2	----	----	----	----	----	----	----	----	40	5	----	----	----	----	----	----	----	----
Grand Haven	5	40	2	0	0	----	----	40	4	0	0	60	5	0	0	0	0	----	----	0	0
Grand Rapids *c*	5	100	2	0	0	----	----	0	0	0	0	60	4	100	6	0	0	----	----	0	0
Holland *d*	5	20	2	0	0	----	----	100	3	0	0	0	0	0	0	0	0	----	----	0	0
CENTRAL DIVISION.†	*62*	*75*	*2*	*0*	*0*	----	----	*64*	*4*	*37*	*4*	*50*	*3*	*80*	*3*	*0*	*0*	*44*	*3*	*50*	*3*
Charlotte (City)	5	100	1	0	0	----	----	100	8	0	0	100	5	0	0	0	0	----	----	0	0
Charlotte	5	100	2	0	0	----	----	100	7	0	0	100	4	0	0	0	0	----	----	0	0
DeWitt *e*	5	0	0	0	0	----	----	80	3	0	0	100	3	0	0	0	0	----	----	0	0
Elsie	5	0	0	0	0	----	----	0	0	0	0	20	4	60	4	0	0	60	2	0	0
Flint—H. P. S. *f*	4	75	3	----	----	----	----	75	4	25	4	100	1	----	----	----	----	25	4	25	6
Hastings	3	100	2	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	67	1
Howell	5	100	1	0	0	----	----	40	3	20	6	100	2	0	0	0	0	----	----	0	0
Hubbardston	5	20	3	----	----	----	----	----	----	----	----	100	2	----	----	----	----	----	----	60	3
Lansing	5	----	----	----	----	----	----	20	2	60	2	20	1	----	----	----	----	----	----	----	----
Mason	5	0	0	0	0	----	----	100	2	40	3	100	3	0	0	0	0	----	----	0	0
North Lansing *g*	5	0	0	0	0	----	----	40	4	0	0	60	3	0	0	0	0	----	----	0	0
Otisville	5	0	0	0	0	----	----	20	3	0	0	0	0	0	0	0	0	----	----	0	0
Ovid	5	40	2	0	0	----	----	0	0	0	0	0	0	100	2	0	0	----	----	0	0
NORTH'N-CENTRAL DIV.†	*5*	*80*	*3*	*0*	*0*	----	----	*0*	*0*	*0*	*0*	*100*	*5*	*40*	*6*	*0*	*0*	----	----	*0*	*0*
Big Rapids—*W. S. W.*	5	80	3	0	0	----	----	0	0	0	0	100	5	40	6	0	0	----	----	0	0
BAY AND EASTERN DIV.†	*59*	*66*	*4*	*40*	*4*	*70*	*2*	*92*	*5*	*29*	*5*	*84*	*4*	*45*	*5*	*0*	*0*	*100*	*4*	*100*	*7*
Bay City—W. H. B.	5	100	3	0	0	----	----	20	6	0	0	100	4	0	0	0	0	----	----	0	0
Bay City—W. R. M. *h*	5	100	3	0	0	----	----	100	7	0	0	100	5	0	0	0	0	----	----	0	0
East Saginaw—N. H. C. *i*	5	0	0	0	0	----	----	100	5	0	0	80	5	20	7	0	0	----	----	100	7
East Saginaw—S. K. *j*	5	60	0	0	0	----	----	100	5	0	0	100	4	60	11	0	0	100	4	0	0
East Saginaw—*M. J. L.* *k*	5	60	4	0	0	60	3	0	0	20	3	80	4	----	----	----	----	----	----	----	----
Lapeer—*H. McC.* *l*	4	0	0	0	0	----	----	50	5	25	6	100	4	75	3	0	0	----	----	0	0
Lexington	5	0	0	0	0	----	----	0	0	----	----	80	4	20	4	0	0	----	----	0	0
Port Huron—H. R. M.	5	0	0	0	0	----	----	100	2	0	0	0	0	20	2	0	0	----	----	0	0
Hort Huron—*A. A. W.* *m*	5	80	4	40	4	----	----	80	6	0	0	20	7	80	3	0	0	----	----	0	0
Saginaw City—N. D. L. *n*	5	40	3	0	0	80	1	40	5	0	0	80	2	0	0	0	0	----	----	0	0
St. Clair	5	0	0	0	0	----	----	60	2	0	0	0	0	0	0	0	0	----	----	0	0
Thornville	5	20	3	0	0	----	----	80	4	40	7	100	5	0	0	0	0	----	----	0	0
SOUTH-WESTERN DIV.†	*38*	*71*	*3*	*0*	*0*	*80*	*2*	*75*	*3*	*60*	*6*	*100*	*3*	*20*	*5*	*0*	*0*	----	----	*20*	*1*
Allegan *o*	5	20	4	0	0	----	----	60	3	0	0	100	5	20	5	0	0	----	----	0	0

	DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent. of Weeks Present.‡	Av. Order of Prevalence when Present.§
	Gastro-hepatic catarrh	25	
a	Very little sickness, and that light, Feb. 3.		
	Abortion, accid'tal (1 case)	20	2
b	Frozen to death	20	3
	Nephritis	20	3
	Puerperal mania	20	3
c	Dyspepsia	40	3
	Sore throat from Dyspepsia	20	3
d	Remittent fever reported by this observer is marked bilious remittent.		
	Nervous fever	20	2
	Paralysis	100	2
e	Abortion, anemia, asthma, cystitis, dysmenorrhea, facial paralysis, goitre, metrorrhagia, parotitis, and puer. eclampsia, each.	20	4
	Pharyngitis	100	2
f	Paralysis, pleurisy, and pharyngitis, each	25	7
g	Very little sickness, Jan. 5		
h	See note *h* for Jan., p. 470.		
i	Chicken-pox	40	5
	Croup, spasmodic	60	4
j	Pharyngitis	20	1
	Ulcerated throat	20	1
k	Anemia	40	3
	Angina pectoris	20	1
	Aphthæ, asthma, acute cystitis, bilious fever, chronic gastritis, hepatitis, and pur. conjunctivitis, each.	20	4
	Hysteria and piles, each	20	3
	Cancer	80	4
	Scrofula	60	4
	Metritis and vertigo, each.	40	4
l	Very little sickness, 2 w'ks ending Jan. 19. All cases mild, Jan. 19.		
m	Cancer	60	6
	Chicken-pox	20	7

Dowagiac—*H. & McM.*..*p*	5	100	4	0	0	....	....	100	5	60	6	100	4	0	0	0	0	....	....	0	0
Mattawan ..... *q*	3	100	1	0	0	....	....	33	2	0	0	100	2	0	0	0	0	....	....	0	0
Niles—S. B. ..... *r*	5	100	2	0	0	....	....	100	2	0	0	100	7	0	0	0	0	....	....	0	0
Niles—J. S. R. ..... *s*	5	0	0	0	0	....	....	100	3	0	0	100	1	0	0	0	0	....	....	0	0
Otsego ..... *t*	5	60	2	0	0	....	....	0	0	0	0	100	3	0	0	0	0	....	....	0	0
Paw Paw ..... *u*	5	60	2	0	0	80	2	40	2	0	0	100	2	0	0	0	0	....	....	20	1
St. Joseph ..... *v*	5	0	0	0	0	....	....	0	0	0	0	0	0	0	0	0	0	....	....	0	0
SOUTH'N-CENTRAL DIV.† ..	*82*	*70*	*3*	*0*	*0*	*70*	*4*	*87*	*3*	*0*	*0*	*93*	*3*	*87*	*4*	*0*	*0*	*80*	*3*	*60*	*4*
Adrian	5	0	0	0	0	....	....	0	0	0	0	80	3	100	2	0	0	....	....	0	0
Albion ..... *w*	5	100	2	0	0	....	....	100	5	0	0	100	4	60	6	0	0	....	....	0	0
Ann Arbor—W. F. B.	5	100	1	0	0	....	....	100	5	0	0	100	6	0	0	0	0	....	....	0	0
Brooklyn	3	0	0	0	0	....	....	33	2	0	0	33	1	67	2	0	0	....	....	0	0
Clinton	4	100	1	0	0	....	....	100	4	0	0	100	5	0	0	0	0	....	....	0	0
Coldwater	5	0	0	0	0	....	....	100	3	0	0	100	1	0	0	0	0	60	2	0	0
Hudson	5	100	2	0	0	....	....	100	1	0	0	100	2	100	6	0	0	....	....	0	0
Jackson (State Prison)..*x*	5	0	0	0	0	....	....	0	0	0	0	100	3	0	0	0	0	100	3	0	0
Kalamazoo	5	60	3	0	0	....	....	0	0	0	0	0	0	100	5	0	0	....	....	0	0
Marshall	5	80	2	0	0	....	....	60	4	0	0	100	3	0	0	0	0	....	....	60	4
Mendon—H. C. C.	5	20	6	0	0	....	....	100	1	0	0	100	4	0	0	0	0	....	....	0	0
Mendon—E. S. ..... *y*	5	20	3	0	0	60	4	80	2	0	0	100	2	0	0	0	0	....	....	0	0
Sturgis	5	0	0	0	0	....	....	100	2	0	0	0	0	0	0	0	0	....	....	0	0
Tecumseh	5	....	....	....	....	....	....	....	....	....	....	60	4	....	....	....	....	....	....	....	....
Three Rivers ..... *z*	5	60	6	0	0	80	3	60	8	0	0	100	3	0	0	0	0	....	....	0	0
York ..... *aa*	5	0	0	0	0	....	....	0	0	0	0	100	2	0	0	0	0	....	....	0	0
Ypsilanti ..... *bb*	5	0	0	0	0	....	....	0	0	0	0	100	2	0	0	0	0	....	....	0	0
SOUTH-EASTERN DIV.†	*73*	*91*	*2*	*100*	*9*	*100*	*5*	*83*	*5*	*20*	*3*	*86*	*4*	*69*	*5*	*0*	*0*	*100*	*4*	*90*	*6*
Dearborn	5	100	3	0	0	....	....	40	5	0	0	100	3	0	0	0	0	....	....	0	0
Detroit—L. C.	5	100	2	100	9	....	....	100	12	0	0	100	3	100	7	0	0	....	....	100	6
Detroit—*E. L.* ..... *cc*	5	100	2	0	0	....	....	100	11	0	0	100	6	100	2	0	0	....	....	100	12
Detroit—W. H. R. ..... *dd*	5	100	2	0	0	....	....	100	4	0	0	100	8	100	10	0	0	....	....	100	1
Milford	5	80	2	0	0	....	....	60	4	0	0	60	4	40	6	0	0	....	....	0	0
Monroe—*F. D.* ..... *ee*	5	100	2	0	0	100	5	100	4	0	0	100	3	0	0	0	0	100	3	100	5
Monroe—W. C. W.	4	0	0	0	0	....	....	0	0	0	0	75	3	0	0	0	0	....	....	100	3
Northville ..... *ff*	5	100	1	0	0	....	....	0	0	0	0	80	3	0	0	0	0	....	....	0	0
Plymouth	5	80	1	0	0	....	....	0	0	0	0	80	3	0	0	0	0	....	....	0	0
Pontiac—W. G. E.	5	100	2	0	0	....	....	100	2	0	0	100	1	60	5	0	0	....	....	0	0
Pontiac—*R. Le B.*	5	100	4	0	0	....	....	100	6	0	0	100	5	0	0	0	0	....	....	0	0
Utica—W. B. ..... *gg*	4	100	1	0	0	....	....	100	5	0	0	100	4	50	5	0	0	100	4	0	0
Walled Lake	5	0	0	0	0	....	....	20	2	0	0	20	6	0	0	0	0	....	....	0	0
Wyandotte—E. P. C.	5	60	1	0	0	....	....	0	0	20	3	80	2	60	2	0	0	....	....	0	0
Wyandotte—*T. J. L.*	5	60	2	0	0	....	....	100	3	0	0	100	4	40	6	0	0	....	....	40	8

n	Very little sickness, Jan. 5 and Feb. 2.		
o	See note *o* for Jan., p. 470.		
p	See note *p* for Jan., p. 470.		
q	Myelitis	100	1
r	Healthy, Jan. 12.		
	Diphtheritic sore throat	40	1
s,t	See notes *s* and *t* for Jan., p. 470.		
u	Bright's disease, hydrocephalus, and periostitis, each	40	3
	Cancer of stomach	20	2
	Dyspepsia, gastrodynia, and strangury, each	20	1
	Gastritis and metritis, each	20	3
	Gonorrhea	60	3
	Mastitis	20	2
	Myelitis	100	3
	Syphilis	80	3
v	Mumps	60	4
w	Pharyngitis	20	3
x	Syphilis	100	4
y	Cardiac asthma	20	5
	Cardiac disease	40	4
	Endo-metritis	20	4
	Metritis	40	5
z	Albuminuria	20	8
	Chicken-pox	20	7
	Dyspepsia	100	1
	Pleurisy	40	7
	Scrofula	20	8
	Continues healthy, 5 w'ks ending Feb. 2.		
aa	Albuminuria	20	1
	Peritonitis	20	2
	Sciatica	20	2
bb	See note *bb* for Jan., p. 470.		
cc	Broncho-pneumonia	100	5
dd	Genuineness of diphtheria questioned. Genuineness of croup questioned for 3 weeks. Very little sickness, 3 w'ks ending Feb. 2.		
ee	Peritonitis	60	5
	Pleuritis	80	4
ff	Diphtheritic sore throat	80	2
	Enteritis	20	3
	Peritonitis	20	4
	Senile gangrene, 1 case.		
gg	Indigestion	100	2

NOTE.—For comments on this table, see pages 399, 403, 421. A summary made from this table is given on pages 404-419.

* For names of observers, see Exhibit 31, pages 320-1.

† For counties in each division, see Exhibit 1, page 153. The numbers in this line are an average for the division.

‡ When less than the full number of reports for the month have been received from any Observer, the number against his name in the column "Per Cent of Weeks Present," for any disease, is the per cent which the number of weeks he reports the disease present is of the number of cards received from him. When less than 2 reports have been received from any Observer for a month of 4 weeks, or less than 3 for a month of 5 weeks, they have not been compiled. When for any week no statement has been made by an Observer, with regard to a disease, and for the other weeks it has been marked 0, the columns for that disease against his name have been left blank. For the purposes of this compilation, each month is made to end on the Saturday nearest the end of the calendar month. In compiling this table, a fraction less than one-half is rejected, a fraction equal to or greater than one-half is counted as one.

a, b, c, etc. These letters refer across the page, from the names of Observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

§, ||, ¶. See foot-notes with these marks on page 422.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **March** *2, 1878.*

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.	
		Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	275	91	2.6	35	5.2	56	8.8	39	5.9	92	5.2	44	7.4	60	4.7	65	4.6	69	7.9	58	5.9	78	2.7	82	3.5	60	8.0	69	6.7
UPPER-PENIN. DIVISION†	*7*	*100*	*2*	----	----	*0*	*0*	*25*	*8*	*57*	*7*	*0*	*0*	*0*	*0*	*86*	*6*	*0*	*0*	*100*	*7*	*0*	*0*	*100*	*1*	*0*	*0*	*0*	*0*
Calumet	4	----	----	----	----	----	----	25	8	25	7	----	----	----	----	100	6	----	----	100	7	----	----	100	1	----	----	----	----
Houghton	3	100	2	----	----	0	0	0	0	100	6	0	0	0	0	67	5	0	0	0	0	0	0	0	0	0	0	0	0
NORTH-EASTERN DIV.†	*4*	*75*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*25*	*2*	*0*	*0*	*25*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*25*	*1*	*0*	*0*	*0*	*0*
Alpena	4	75	1	0	0	0	0	0	0	0	0	25	2	0	0	25	2	0	0	0	0	0	0	25	1	0	0	0	0
WESTERN DIVISION†	*16*	*81*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*4*	*50*	*7*	*75*	*6*	*75*	*5*	*75*	*7*	*50*	*5*	*38*	*4*	*94*	*2*	*50*	*7*	----	----
Coopersville	4	100	1	0	0	0	0	0	0	100	3	50	7	0	0	100	6	75	7	75	6	0	0	75	4	75	7	0	0
Grand Haven	4	75	3	0	0	0	0	0	0	0	0	0	0	50	5	50	4	0	0	0	0	25	2	100	2	0	0	0	0
Grand Rapids	4	100	4	0	0	0	0	0	0	100	5	0	0	100	6	0	0	0	0	0	0	50	6	100	2	25	7	0	0
Holland	4	50	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	3	0	0	100	1	0	0	0	0
CENTRAL DIVISION†	*50*	*97*	*2*	*25*	*5*	*0*	*0*	*75*	*3*	*100*	*5*	*25*	*1*	*81*	*4*	*54*	*4*	*0*	*0*	*50*	*4*	*74*	*3*	*91*	*4*	*42*	*8*	*75*	*5*
Charlotte (City)	4	100	2	0	0	0	0	0	0	100	10	0	0	0	0	100	4	0	0	0	0	100	5	100	6	50	10	100	8
Charlotte	4	100	1	0	0	0	0	0	0	100	11	0	0	100	10	100	5	0	0	0	0	100	5	100	6	50	10	100	8
DeWitt	4	100	1	0	0	0	0	0	0	100	4	0	0	0	0	50	3	0	0	75	4	50	4	0	0	0	0	0	0
Elsie	4	0	0	25	4	0	0	0	0	0	0	0	0	0	0	25	3	0	0	25	4	50	3	50	3	0	0	75	3
Hastings	4	0	0	0	0	0	0	0	0	100	4	0	0	75	3	0	0	0	0	0	0	100	3	0	0	0	0	0	0
Howell	4	100	1	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	25	5	0	0	0	0	0	0
Hubbardston	4	----	----	----	----	----	----	----	----	100	3	----	----	----	----	25	3	----	----	----	----	50	2	----	----	----	----	----	----
Ionia	2	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
Lansing	4	----	----	----	----	----	----	----	----	----	----	25	1	----	----	----	----	----	----	----	----	50	2	----	----	----	----	----	----
Mason	4	100	2	0	0	0	0	75	3	0	0	0	0	0	0	25	3	0	0	0	0	100	2	100	2	0	0	0	0
North Lansing	4	100	2	0	0	0	0	0	0	100	1	0	0	50	2	0	0	0	0	0	0	100	2	0	0	25	4	25	2
Otisville	4	100	2	0	0	0	0	0	0	100	3	0	0	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ovid	4	75	1	25	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	4	0	0	100	2	0	0	0	0
NORTHERN-CENTRAL DIV.†	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*25*	*6*	----	----	*0*	*0*	*100*	*4*	*0*	*0*	*50*	*5*	*100*	*3*	*75*	*3*	*0*	*0*	*0*	*0*
Big Rapids—*W. S. W.*	4	0	0	0	0	0	0	0	0	25	6	----	----	0	0	100	4	0	0	50	5	100	3	75	3	0	0	0	0
BAY AND EASTERN DIV.†	*44*	*90*	*3*	*0*	*0*	*50*	*9*	*50*	*10*	*98*	*5*	*25*	*10*	*57*	*5*	*45*	*4*	*75*	*5*	*69*	*7*	*93*	*2*	*75*	*4*	*50*	*8*	*58*	*8*
Bay City—W. H. B.	4	100	6	0	0	0	0	0	0	100	5	0	0	50	7	0	0	0	0	0	0	100	1	100	2	0	0	0	0
Bay City—W. R. M.	4	100	7	0	0	0	0	0	0	100	9	0	0	50	6	50	8	0	0	0	0	100	1	100	4	0	0	50	10
East Saginaw—N. H. C.	4	100	2	0	0	0	0	0	0	100	8	25	10	100	5	0	0	0	0	0	0	100	1	0	0	0	0	0	0
East Saginaw—S. K.	4	100	1	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	75	7	100	3	75	5	0	0	0	0
East Saginaw—*M. J. L.*	4	25	1	0	0	0	0	0	0	75	3	0	0	25	3	25	2	0	0	0	0	50	2	100	2	0	0	0	0
Lexington	4	75	2	0	0	0	0	0	0	100	3	0	0	25	4	25	3	0	0	0	0	0	0	50	2	0	0	0	0
Port Huron—H. R. M.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	3	0	0	0	0	100	1	0	0	0	0	0	0
Port Huron—*A. A. W.*	4	100	1	----	----	----	----	----	----	100	4	----	----	----	----	----	----	----	----	----	----	100	2	25	4	----	----	----	----
Saginaw City—N. D. L.	4	100	3	0	0	0	0	0	0	100	5	0	0	50	5	0	0	0	0	75	6	100	1	0	0	50	8	0	0
Saginaw City—*I. N. S.*	4	100	2	----	----	50	9	50	10	100	3	----	----	100	6	100	6	75	5	100	6	75	4	75	9	50	7	25	9
Thornville	4	100	4	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	25	7	100	2	0	0	0	0	100	4

SOUTH-WESTERN DIV.†	*35*	*84*	*3*	*75*	*7*	*25*	*6*	*25*	*7*	*97*	*4*	*25*	*8*	*33*	*4*	*50*	*6*	*50*	*6*	*53*	*5*	*74*	*2*	*81*	*3*	*50*	*10*	*38*	*7*
Allegan	4	100	1	0	0	0	0	0	0	100	5	0	0	25	3	0	0	0	0	25	5	50	3	100	4	0	0	0	0
Dowagiac—*H. S. McM.*	4	100	6	75	7	25	6	0	0	100	5	25	6	0	0	25	6	0	0	25	6	100	2	100	1	0	0	0	0
Mattawan	3	67	3	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	67	3	67	2	67	2	0	0	0	0
Niles—S. B	4	100	5	0	0	0	0	0	0	100	6	0	0	25	6	0	0	0	0	100	8	100	4	100	6	50	10	50	8
Niles—*O. P. H.*	4	0	0	0	0	0	0	25	5	100	4	0	0	50	4	0	0	0	0	50	4	100	3	0	0	0	0	25	5
Niles—J. S. R.	4	100	2	0	0	0	0	25	8	75	6	25	9	0	0	75	5	50	6	0	0	100	4	75	7	0	0	0	0
Otsego	4	50	3	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
Paw Paw	4	50	3	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	25	1	25	2	0	0	0	0
St. Joseph	4	100	1	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	25	2	100	2	0	0	0	0
SOUTHERN-CENTRAL DIV.†	*67*	*94*	*2*	*0*	*0*	*0*	*0*	*36*	*5*	*88*	*5*	*25*	*5*	*69*	*4*	*79*	*6*	*100*	*6*	*48*	*6*	*76*	*3*	*79*	*4*	*0*	*0*	*75*	*5*
Adrian	4	100	2	0	0	0	0	25	4	100	3	0	0	0	0	50	5	0	0	25	4	100	2	0	0	0	0	0	0
Albion	3	100	3	0	0	0	0	67	8	100	3	0	0	0	0	67	7	100	6	100	5	100	2	100	2	0	0	0	0
Ann Arbor—W. F. B.	4	100	2	0	0	0	0	25	3	100	9	0	0	0	0	100	6	0	0	0	0	100	6	100	6	0	0	100	8
Brooklyn	4	50	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clinton	4	50	3	0	0	0	0	0	0	100	8	0	0	50	6	0	0	0	0	75	6	25	2	100	3	0	0	75	7
Coldwater	4	100	2	0	0	0	0	0	0	0	0	0	0	25	3	0	0	0	0	0	0	25	3	25	4	0	0	0	0
Hudson	4	100	2	0	0	0	0	0	0	25	6	0	0	0	0	100	4	0	0	0	0	100	3	75	5	0	0	0	0
Jackson (State Prison)	4	100	1	----	----	----	----	----	----	100	5	----	----	----	----	----	----	----	----	50	6	75	2	25	2	----	----	----	----
Kalamazoo	4	100	6	0	0	0	0	0	0	100	7	0	0	100	4	0	0	0	0	0	0	100	1	100	2	0	0	0	0
Marshall	4	100	2	0	0	0	0	0	0	25	5	0	0	0	0	0	0	0	0	0	0	25	4	0	0	0	0	0	0
Mendon—H. C. C.	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	100	3	0	0	0	0
Mendon—E. S.	4	100	1	----	----	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	25	2	75	2	0	0	0	0
Sturgis	4	100	2	0	0	0	0	0	0	100	4	25	5	0	0	0	0	0	0	25	5	100	3	75	4	0	0	0	0
Tecumseh	4	100	3	----	----	----	----	----	----	100	5	----	----	----	----	----	----	----	----	----	----	50	2	----	----	----	----	100	2
Three Rivers	4	100	4	0	0	0	0	0	0	100	9	0	0	0	0	75	8	0	0	25	8	100	2	100	8	0	0	0	0
York	4	100	2	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0
Ypsilanti	4	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0	100	2	0	0	0	0	25	3
SOUTH-EASTERN DIV.†	*48*	*94*	*3*	*26*	*5*	*75*	*10*	*40*	*6*	*92*	*6*	*82*	*11*	*52*	*5*	*74*	*5*	*64*	*10*	*68*	*8*	*82*	*3*	*87*	*4*	*100*	*8*	*81*	*9*
Dearborn	4	0	0	25	5	0	0	25	6	0	0	0	0	25	3	50	1	0	0	50	4	0	0	100	2	0	0	0	0
Detroit—L. C.	4	100	4	0	0	50	16	50	6	100	7	0	0	0	0	100	3	50	12	100	10	100	4	100	11	0	0	100	12
Detroit—*E. L.*	4	100	6	0	0	0	0	0	0	100	10	50	14	75	10	100	8	100	10	75	13	100	4	100	2	0	0	100	14
Detroit—W. H. R.	3	100	2	0	0	0	0	0	0	100	7	100	14	100	9	100	8	33	9	100	12	100	6	100	5	100	14	0	0
Milford	4	100	3	0	0	0	0	0	0	0	0	0	0	25	5	0	0	0	0	0	0	100	1	0	0	0	0	25	5
Monroe—*E. D.*	4	100	5	25	5	100	4	0	0	100	4	100	6	100	2	100	6	0	0	50	4	100		100	3	100	5	100	6
Northville	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	2	0	0	0	0	25	1	0	0	0	0	0	0
Plymouth	3	67	2	0	0	0	0	0	0	67	4	0	0	0	0	0	0	0	0	33	3	0	0	0	0	0	0	0	0
Pontiac—W. G. E.	4	100		0	0	0	0	25	6	100	7	0	0	0	0	75	5	0	0	0	0	100	4	0	0	100	6	0	0
Utica—G. G. R.	4	100	4	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	25	7	100	4	0	0	0	0
Walled Lake	4	0	0	0	0	0	0	50	6	100	4	0	0	25	4	50	4	0	0	0	0	100	1	50	2	0	0	0	0
Wyandotte—E. P. C.	4	75	2	----	----	----	----	50	4	50	3	----	----	25	3	----	----	----	----	----	----	75	3	50	2	----	----	----	----
Wyandotte—*T. J. L.*	2	100		0	0	0	0	0	0	100	6	0	0	50	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* For names of observers, see Exhibit 31, pages 420–1.
† For counties in each division, see Exhibit 1, page 153. The numbers in this line are an average for the division.
‡ For this reference, see foot-note on page 423. A summary made from this table is given on pages 404, 419.
§ The disease of which there were the most cases was to be marked 1 in order, on the cards; that of which there was the next greatest number, 2; and so on. Diseases not present were to be marked 0. This column states the average order of prevalence only for those weeks the disease was reported present.
|| The numbers in this line are statements not for all the localities represented, but for those in which the disease was reported present.

NOTE.—March 12, 1879, C. G. Robertson, M. D., of St. Clair, wrote: "There has been very little sickness of any kind during the month of February,—some now, fevers and bowel complaints. There are a number of cases of scarlet fever within a few miles of the city; none here yet."

TABLE 3.—*Diseases, by Localities in Michigan, Four Weeks ending* **March** *2, 1878.*—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Influenza. Per ct. of Weeks Present.††	Influenza. Av. Ord. of Prev. when Present.§	Measles. Per ct. of Weeks Present.††	Measles. Av. Ord. of Prev. when Present.§	Neuralgia.¶ Per ct. of Weeks Present.††	Neuralgia.¶ Av. Ord. of Prev. when Present.§	Pneumonia. Per ct. of Weeks Present.††	Pneumonia. Av. Ord. of Prev. when Present.§	Puerperal Fever. Per ct. of Weeks Present.††	Puerperal Fever. Av. Ord. of Prev. when Present.§	Rheumatism. Per ct. of Weeks Present.††	Rheumatism. Av. Ord. of Prev. when Present.§	Scarlatina. Per ct. of Weeks Present.††	Scarlatina. Av. Ord. of Prev. when Present.§	Smallpox. Per ct. of Weeks Present.††	Smallpox. Av. Ord. of Prev. when Present.§	Tonsilitis.¶ Per ct. of Weeks Present.††	Tonsilitis.¶ Av. Ord. of Prev. when Present.§	Whooping-cough. Per ct. of Weeks Present.††	Whooping-cough. Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	275	84	2.4	55	4.8	63	4.4	80	4.2	29	6.5	92	3.9	58	4.8	0	0	73	4.3	65	4.9
UPPER-PENIN. DIV.†	7	*100*	*1*	*100*	*3*	*100*	*7*	*100*	*7*	*0*	*0*	*100*	*6*	*86*	*4*	*0*	*0*	*67*	*5*	*100*	*3*
Calumet	4	----	----	100	3	----	----	100	7	----	----	100	4	100	4	----	----	----	----	100	3
Houghton *a*	3	100	1	0	0	100	7	0	0	0	0	100	7	67	3	0	0	67	5	0	0
NORTH-EASTERN DIV.†	*4*	*0*	*0*	*0*	*0*	----	----	*75*	*2*	*0*	*0*	*50*	*2*	*0*	*0*	*0*	*0*	----	----	*0*	*0*
Alpena *b*	4	0	0	0	0	----	----	75	2	0	0	50	2	0	0	0	0	----	----	0	0
WESTERN DIVISION†	*16*	*75*	*2*	*25*	*2*	----	----	*92*	*4*	*50*	*7*	*75*	*5*	*63*	*5*	*0*	*0*	----	----	----	----
Coopersville	4	100	3	0	0	----	----	75	6	0	0	100	5	0	0	0	0	----	----	0	0
Grand Haven	4	25	2	0	0	----	----	100	4	0	0	100	4	0	0	0	0	----	----	0	0
Grand Rapids *c*	4	100	2	0	0	----	----	0	0	50	7	25	6	100	6	0	0	----	----	0	0
Holland *d*	4	0	0	25	2	----	----	100	3	0	0	75	3	25	3	0	0	----	----	0	0
CENTRAL DIVISION†	*50*	*83*	*3*	*0*	*0*	----	----	*60*	*4*	*25*	*7*	*100*	*3*	*69*	*4*	*0*	*0*	*25*	*4*	*67*	*3*
Charlotte (city)	4	100	3	0	0	----	----	100	7	25	10	100	4	0	0	0	0	----	----	0	0
Charlotte	4	100	3	0	0	----	----	100	7	25	9	100	3	0	0	0	0	----	----	0	0
DeWitt *e*	4	0	0	0	0	----	----	25	2	0	0	100	2	0	0	0	0	----	----	0	0
Elsie	4	0	0	0	0	----	----	25	3	0	0	0	0	100	1	0	0	----	----	0	0
Hastings	4	100	3	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	100	1
Howell	4	100	2	0	0	----	----	100	3	0	0	100	5	50	6	0	0	----	----	0	0
Hubbardston	4	50	2	----	----	----	----	----	----	----	----	100	3	25	5	----	----	----	----	75	3
Ionia	2	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Lansing	4	----	----	----	----	----	----	50	2	25	2	----	----	----	----	----	----	----	----	----	----
Mason	4	0	0	0	0	----	----	75	3	0	0	100	3	0	0	0	0	----	----	0	0
North Lansing *f*	4	0	0	0	0	----	----	50	4	0	0	100	3	0	0	0	0	25	4	25	4
Otisville	4	0	0	0	0	----	----	50	4	0	0	0	0	0	0	0	0	----	----	0	0
Ovid	4	50	4	0	0	----	----	25	5	0	0	0	0	100	3	0	0	----	----	0	0
NORTH'N-CENTRAL DIV.†	*4*	*100*	*2*	*0*	*0*	----	----	*0*	*0*	*0*	*0*	*100*	*4*	*0*	*0*	*0*	*0*	----	----	*0*	*0*
Big Rapids—*W. & W.* *g*	4	100	2	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0
BAY AND EASTERN DIV.†	*44*	*79*	*3*	*25*	*5*	----	----	*81*	*4*	*25*	*6*	*94*	*4*	*67*	*5*	*0*	*0*	----	----	*50*	*11*
Bay City—W. H. B.	4	100	4	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0
Bay City—W. R. M. *h*	4	100	4	0	0	----	----	100	6	0	0	100	6	0	0	0	0	----	----	0	0
East Saginaw—N. H. C. *i*	4	0	0	0	0	----	----	100	5	0	0	100	6	100	3	0	0	----	----	75	10
East Saginaw—S. K. *j*	4	0	0	0	0	----	----	100	4	0	0	100	3	100	8	0	0	----	----	0	0
East Saginaw—*M. J. L.* *k*	4	0	0	0	0	----	----	0	0	0	0	0	0	75	1	----	----	----	----	----	----
Lexington	4	0	0	0	0	----	----	100	2	0	0	75	3	0	0	0	0	----	----	0	0
Port Huron—H. R. M.	4	0	0	0	0	----	----	25	2	0	0	0	0	25	2	0	0	----	----	0	0
Port Huron—*A. A. W.* *l*	4	50	4	25	5	----	----	25	5	25	6	100	5	50	9	----	----	----	----	----	----
Saginaw City—N. D. L.	4	25	4	0	0	----	----	100	5	0	0	100	3	0	0	0	0	----	----	0	0
Saginaw City—*I. N. S.* *m*	4	100	3	----	----	----	----	100	5	----	----	100	2	50	9	----	----	----	----	25	11
Thornville	4	100	1	0	0	----	----	75	5	0	0	75	6	0	0	0	0	----	----	0	0
SOUTH-WESTERN DIV.†	*35*	*85*	*2*	*0*	*0*	*38*	*3*	*86*	*3*	*0*	*0*	*97*	*3*	*37*	*4*	*0*	*0*	----	----	*33*	*1*

	DISEASES REPORTED WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
	Cerebral meningitis	67	4
a	Neuralgia very prevalent, Feb. 16 and Mar. 2. Tonsilitis in severe form very prevalent, Feb. 23.		
	Abortion	25	2
b	Cystorrhœa	25	2
	Hepatitis	50	2
	Nephritis	25	2
c	Dyspepsia	100	3
d	Remit'nt fever marked bilious, 3 w'ks end'g Feb. 23.		
	Paralysis	50	3
e	Facial paralysis	25	3
	Gastralgia	25	3
	Goitre	50	4
	Melancholia	25	4
	Pharyngitis	100	1
	Parotitis	50	3
	Albuminuria	50	4
	Chorea	25	2
	Enteritis	25	2
	Hepatitis	75	3
f	Pericarditis	50	4
	Peritonitis	25	4
	Pleurisy	25	4
	Puerperal cellulitis	75	4
	Many cases mumps, Feb. 9.		
g	Croup	25	6
h	See note *h* for Feb., p. 470.		
i	Chicken-pox	100	7
	Croup, spasmodic	75	8
j	Chicken-pox	25	4
	Sore throat	25	5
	See note *j* for Feb., p. 470.		
k	Cancer (facial), chlorosis, croup, lichen, metritis, and thrush, each	25	3-6
	Scrofula	25	3
l	Cancer of stomach	25	6
m	See note *m* for Feb., p. 470.		

Allegan	4	0	0	0	0	----	----	50	4	0	0	100	2	50	5	0	0	----	----	0	0
Dowagiac—*H. S. McM.* *n*	4	100	5	0	0	----	----	100	3	0	0	100	5	0	0	0	0	----	----	----	----
Mattawan *o*	3	100	1	0	0	----	----	100	2	0	0	67	2	33	1	0	0	----	----	33	1
Niles—S. B. *p*	4	100	1	0	0	----	----	100	2	0	0	100	9	25	10	0	0	----	----	0	0
Niles—*O. P. H.* *q*	4	75	1	0	0	25	3	100	2	0	0	100	3	25	2	0	0	----	----	0	0
Niles—J. S. R.	4	0	0	0	0	----	----	100	5	0	0	100	1	0	0	0	0	----	----	0	0
Otsego	4	50	4	0	0	----	----	50	3	0	0	100	3	0	0	0	0	----	----	0	0
Paw Paw *r*	4	75	1	0	0	50	3	75	1	0	0	100	2	0	0	0	0	----	----	0	0
St. Joseph *s*	4	100	1	0	0	----	----	100	3	0	0	0	0	50	3	0	0	----	----	0	0
SOUTH'N-CENTRAL DIV.†	*67*	*90*	*2*	*0*	*0*	*75*	*5*	*81*	*4*	*25*	*5*	*93*	*4*	*43*	*5*	*0*	*0*	*100*	*4*	*25*	*8*
Adrian	4	50	1	0	0	----	----	0	0	0	0	75	4	25	4	0	0	----	----	0	0
Albion *t*	3	100	1	0	0	----	----	100	6	0	0	100	4	100	7	0	0	----	----	0	0
Ann Arbor—W. F. B.	4	100	2	0	0	----	----	100	4	25	5	100	7	25	6	0	0	----	----	0	0
Brooklyn	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Clinton	4	100	2	0	0	----	----	100	3	0	0	100	4	0	0	0	0	----	----	0	0
Coldwater *u*	4	0	0	0	0	----	----	100	2	0	0	100	2	0	0	0	0	----	----	0	0
Hudson	4	100	2	0	0	----	----	100	3	0	0	100	3	25	5	0	0	----	----	0	0
Jackson (State Prison) *v*	4	----	----	----	----	----	----	----	----	----	----	100	3	----	----	----	----	100	4	----	----
Kalamazoo	4	100	3	0	0	----	----	25	7	0	0	0	0	100	5	0	0	----	----	25	8
Marshall	4	100	2	0	0	----	----	0	0	0	0	100	2	0	0	0	0	----	----	0	0
Mendon—H. C. C. *w*	4	0	0	0	0	----	----	100	3	0	0	100	5	25	6	0	0	----	----	0	0
Mendon—E. S. *x*	4	0	0	0	0	----	----	50	3	0	0	50	3	25	3	0	0	----	----	0	0
Sturgis	4	0	0	0	0	----	----	100	1	0	0	0	0	0	0	0	0	----	----	0	0
Tecumseh	4	----	----	----	----	----	----	----	----	----	----	100	3	50	6	----	----	----	----	----	----
Three Rivers *y*	4	75	6	0	0	75	5	75	4	0	0	100	5	0	0	0	0	----	----	0	0
York *z*	4	0	0	0	0	----	----	50	3	0	0	100	2	0	0	0	0	----	----	0	0
Ypsilanti *aa*	4	0	0	0	0	----	----	0	0	0	0	75	2	25	4	0	0	----	----	0	0
SOUTH-EASTERN DIV.†	*48*	*82*	*2*	*63*	*7*	*75*	*4*	*91*	*6*	*0*	*0*	*87*	*4*	*72*	*5*	*0*	*0*	*100*	*4*	*76*	*5*
Dearborn	4	25	1	0	0	----	----	0	0	0	0	75	3	0	0	0	0	----	----	0	0
Detroit—L. C.	4	100	7	100	10	----	----	100	12	0	0	100	5	100	10	0	0	----	----	100	3
Detroit—*E. L.* *bb*	4	100	2	0	0	----	----	100	15	0	0	100	6	100	6	0	0	----	----	100	5
Detroit—W. H. R. *cc*	3	100	3	0	0	----	----	100	5	0	0	100	10	100	11	0	0	----	----	100	1
Milford	4	100	2	0	0	----	----	75	4	0	0	75	5	50	6	0	0	----	----	0	0
Monroe—*E. D.* *dd*	4	100	2	0	0	75	4	100	5	0	0	100	3	0	0	0	0	100	4	25	6
Northville *ee*	4	50	1	0	0	----	----	----	----	0	0	75	2	25	2	0	0	----	----	0	0
Plymouth	3	100	1	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Pontiac—W. G. E.	4	100	3	0	0	----	----	100	3	0	0	100	2	0	0	0	0	----	----	0	0
Utica—G. G. R. *ff*	4	100	1	25	4	----	----	75	5	0	0	100	4	25	3	0	0	----	----	0	0
Walled Lake	4	0	0	0	0	----	----	75	3	0	0	50	3	0	0	0	0	----	----	0	0
Wyandotte—E. P. C.	4	25	2	----	----	----	----	----	----	----	----	75	2	100	1	----	----	----	----	----	----
Wyandotte—*T. J. L.*	2	100	2	0	0	----	----	100	4	0	0	100	7	100	3	0	0	----	----	50	8

n	Very little acute disease, week ending Mar. 2.		
o	Myelitis	100	2
p	Inflammation of throat of diphtheritic form	25	1
q	Generally very healthy, Feb. 9. No disease of an epidemic character prevailing, Feb. 23.		
r	Bright's disease, cancer of stomach, gastralgia, locomotor ataxia, and splenitis, each	25	3
	Myelitis	75	3
	Periostitis and syphilis, each	50	3
	Cancer of bowels	50	2
	Peritonitis	75	3
	Spinal irritation	25	2
s	See note *s* for Feb., p. 470.		
t	See note *t* for Feb., p. 470.		
u	One case of diphtheria.		
v	Syphilis	100	5
w	But few cases of any disease, Feb. 23.		
x	Cerebral meningitis	25	4
y	Chicken-pox	25	8
	Dyspepsia	100	1
	Pleurisy	25	6
z	More sickly, 2 w'ks ending Feb. 16. More healthy, 2 w'ks ending Mar. 2.		
aa	Peritonitis and pleuritis, each	50	2
bb	General good health, Feb. 23. Not much illness, Mar. 2.		
	Broncho-pneumonia	100	10
	Diarrhea in almost every case was ushered in by chill and fever.		
cc	See note *cc* for Feb., p 470.		
dd	Asthma	25	3
	Cystitis	25	5
	Pleuritis	100	5
ee	Croup	25	3
	Enteritis	50	3
	Some sort of bowel difficulty, with fever, I don't know what	25	2
	Very healthy, 2 weeks ending Feb. 23.		
ff	Dyspepsia	100	2

* For names of observers, see Exhibit 31, pages 420-1.

† For counties in each division, see Exhibit 1, page 153. ‡ See foot-note on page 425.

§ The disease of which there were the most cases was to be marked 1 in order, on the cards; that of which there was the next greatest number, 2; and so on. Diseases not prevalent were to be marked 0. This column states the av. order of prevalence only for those weeks the disease was reported present.

‖ The numbers in this line are statements not for all the localities represented, but for those in which the disease was reported present.

¶ Neuralgia and Tonsilitis were not printed on any of the postal blanks used previously to October, 1878, and were printed on only a part of those used from that time till January, 1879. Hence it is probable that they were not so fully reported during the first nine months of the year as during the last quarter, and not so fully at any time as were the other diseases tabulated.

a, b, c, etc. These letters refer across the page, from the names of observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **March** *30, 1878.*

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.	
		Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	274	89	2.6	25	4.5	29	6.7	58	7.3	93	5.2	62	6.8	58	5.6	70	4.0	66	6.4	71	6.4	86	2.5	76	3.5	56	9.1	62	6.6
UPPER-PENIN. DIVISION†	*8*	*100*	*3*	----	----	----	----	*75*	*6*	*100*	*9*	*25*	*6*	----	----	*88*	*6*	*50*	*6*	*75*	*6*	----	----	*100*	*1*	----	----	*0*	*0*
Calumet	4	----	----	----	----	----	----	75	6	----	----	25	6	----	----	100	5	50	6	75	6	----	----	100	1	----	----	----	----
Houghton	4	100	3	----	----	----	----	----	----	100	9	----	----	----	----	75	6	----	----	----	----	----	----	----	----	----	----	----	----
NORTH-EASTERN DIV.†	*4*	*100*	*1*	*0*	*0*	*25*	*2*	*0*	*0*	*75*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Alpena	4	100	1	0	0	25	2	0	0	75	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WESTERN DIVISION†	*14*	*80*	*3*	*0*	*0*	*25*	*3*	*0*	*0*	*100*	*4*	*0*	*0*	*50*	*3*	*100*	*3*	*50*	*4*	*50*	*3*	*87*	*4*	*92*	*2*	*0*	*0*	*25*	*6*
Coopersville	2	100	1	----	----	----	----	----	----	100	2	----	----	----	----	100	3	50	4	----	----	----	----	----	----	----	----	----	----
Grand Haven	4	50	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	2	75	2	0	0	0	0
Grand Rapids	4	100	4	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	6	100	1	0	0	25	6
Holland	4	0	0	0	0	25	3	0	0	0	0	0	0	50	3	0	0	0	0	50	3	0	0	100	2	0	0	0	0
CENTRAL DIVISION†	*51*	*90*	*2*	*25*	*2*	*25*	*9*	*63*	*4*	*93*	*5*	*25*	*4*	*75*	*5*	*63*	*4*	*0*	*0*	*33*	*5*	*88*	*2*	*72*	*4*	*50*	*8*	*73*	*5*
Charlotte (City)	4	100	2	0	0	0	0	0	0	100	10	0	0	75	9	100	4	0	0	0	0	100	5	100	7	0	0	75	8
Charlotte	4	100	1	0	0	25	9	0	0	100	11	0	0	100	9	100	4	0	0	0	0	100	4	100	7	25	11	75	8
DeWitt	4	100	1	0	0	0	0	0	0	100	4	0	0	0	0	25	3	0	0	0	0	50	2	50	2	0	0	0	0
Elsie	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	3	50	3	0	0	100	3
Hastings	4	0	0	0	0	0	0	0	0	100	4	0	0	75	3	0	0	0	0	0	0	100	3	0	0	0	0	0	0
Howell	4	100	1	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	25	7	75	2	25	4	0	0	0	0
Hubbardston	4	0	0	0	0	0	0	0	0	100	9	0	0	0	0	100	6	0	0	0	0	100	1	50	2	0	0	0	0
Ionia	4	50	5	0	0	0	0	50	5	100	3	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
Lansing	3	33	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100	1	33	3	----	----	33	1
Mason	4	100	2	0	0	0	0	75	3	25	4	0	0	0	0	25	3	0	0	50	4	100	2	100	3	0	0	0	0
North Lansing	4	100	3	0	0	0	0	0	0	100	1	25	4	50	3	0	0	0	0	0	0	100	2	0	0	75	4	0	0
Otisville	4	100	1	0	0	0	0	0	0	100	2	0	0	75	3	0	0	0	0	25	4	0	0	0	0	0	0	0	0
Ovid	4	100	2	25	2	0	0	0	0	0	0	0	0	0	0	25	3	0	0	0	0	0	0	100	2	0	0	0	0
NORTHERN-CENTRAL DIV.†	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*33*	*4*	*0*	*0*	*100*	*5*	*100*	*2*	*100*	*1*	*0*	*0*	*0*	*0*
Big Rapids—*W. & W.*	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	4	0	0	100	5	100	2	100	1	0	0	0	0
BAY AND EASTERN DIV.†	*48*	*96*	*3*	*25*	*6*	*0*	*0*	*25*	*11*	*96*	*5*	*63*	*7*	*57*	*6*	*85*	*4*	*50*	*10*	*76*	*7*	*90*	*2*	*86*	*3*	*25*	*9*	*65*	*5*
Bay City—W. H. B.	4	100	5	0	0	0	0	0	0	100	5	50	7	0	0	0	0	0	0	0	0	100	1	100	2	0	0	50	5
Bay City—W. R. M.	4	100	6	0	0	0	0	0	0	100	9	75	8	100	8	0	0	0	0	0	0	100	1	100	2	0	0	100	5
East Saginaw—N. H. C.	4	100	3	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
East Saginaw—S. K.	4	100	1	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	100	7	100	4	100	4	0	0	0	0
East Saginaw—*M. J. L.*	4	50	2	0	0	0	0	0	0	75	2	0	0	0	0	0	0	0	0	0	0	50	2	75	1	0	0	0	0
Lapeer—*H. McC.*	2	100	1	0	0	0	0	0	0	100	3	0	0	0	0	50	4	0	0	100	5	50	2	0	0	0	0	0	0
Lapeer—A. N.	3	100	2	0	0	0	0	0	0	100	8	0	0	0	0	100	7	0	0	33	9	100	6	100	5	0	0	67	4
Lexington	3	100	2	0	0	0	0	0	0	100	4	0	0	100	4	100	2	0	0	0	0	67	4	0	0	0	0	0	0
Port Huron—H. R. M.	2	0	0	0	0	0	0	0	0	0	0	0	0	50	3	50	1	0	0	0	0	100	2	0	0	0	0	0	0
Port Huron—*A. A. W.*	4	100	2	----	----	----	----	----	----	100	4	----	----	25	6	----	----	----	----	----	----	100	3	25	3	----	----	25	4

Saginaw City—N. D. L.	4	100	3	0	0	0	0	0	0	100	4	50	4	0	0	0	0	0	0	50	5	100	1	0	0	0	0	0	0
Saginaw City—*I. N. S.*	4	100	3	25	6	----	.	25	11	100	4	75	7	50	10	100	6	50	10	100	8	100	2	100	7	25	9	50	7
St. Clair	2	100	4	0	0	0	0	0	0	50	5	0	0	0	0	100	4	0	0	0	0	50	1	100	2	0	0	0	0
Thornville	4	100	3	0	0	0	0	0	0	100	7	0	0	25	2	75	4	0	0	0	0	100	1	0	0	0	0	100	5
SOUTH-WESTERN DIV.†	*35*	*78*	*3*	*25*	*5*	*25*	*6*	*25*	*8*	*100*	*4*	*50*	*1*	*33*	*4*	*50*	*5*	*0*	*0*	*100*	*6*	*74*	*3*	*67*	*4*	*0*	*0*	*38*	*6*
Allegan	4	75	1	25	5	0	0	0	0	100	5	0	0	0	0	25	6	0	0	0	0	100	3	50	7	0	0	0	0
Dowagiac—*H. S. McM.*	1	100	5	0	0	25	6	0	0	100	5	0	0	0	0	75	5	0	0	0	0	100	2	100	1	0	0	0	0
Mattawan	3	67	3	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	33	2	33	3	0	0	0	0
Niles—S. B.	4	100	5	0	0	0	0	25	8	100	6	0	0	25	7	0	0	0	0	100	8	100	3	100	4	0	0	50	8
Niles—*O. P. H.*	4	0	0	0	0	0	0	0	0	100	5	0	0	50	2	0	0	0	0	100	3	100	3	----	----	0	0	25	3
Niles—J. S. R.	4	100	3	0	0	0	0	0	0	100	4	50	7	0	0	25	5	0	0	0	0	50	5	25	9	0	0	0	0
Otsego	4	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
Paw Paw	4	0	0	0	0	0	0	0	0	100	3	0	0	0	0	75	3	0	0	0	0	50	2	50	2	0	0	0	0
St. Joseph	4	25	2	0	0	0	0	0	0	100		0	0	25	2	0	0	0	0	0	0	25	2	100	2	0	0	0	0
SOUTHERN-CENTRAL DIV.†	*67*	*95*	*2*	*0*	*0*	*0*	*0*	*38*	*6*	*91*	*5*	*67*	*7*	*59*	*4*	*68*	*5*	*50*	*4*	*69*	*7*	*88*	*3*	*78*	*4*	*50*	*6*	*43*	*6*
Adrian	4	100	3	0	0	0	0	50	3	100	3	0	0	25	1	75	3	25	3	0	0	100	1	0	0	0	0	0	0
Albion	2	100	2	0	0	0	0	0	0	100	3	0	0	0	0	100	5	100	4	100	5	100	2	100	3	0	0	0	0
Ann Arbor—W. F. B.	4	100	2	0	0	0	0	25	8	100	9	0	0	0	0	25		0	0	0	0	100	5	100	7	0	0	0	0
Brooklyn	4	100	1	0	0	0	0	0	0	0	0	0	0	50	3	0	0	0	0	0	0	25	3	0	0	0	0	0	0
Clinton	3	100	4	0	0	0	0	0	0	100	8	67	7	33	7	0	0	0	0	67	7	0	0	100	4	0	0	67	6
Coldwater	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	4	100	4	0	0	0	0
Hudson	4	25	2	0	0	0	0	0	0	25	6	0	0	0	0	100	4	0	0	0	0	100	1	100	2	0	0	0	0
Jackson—W. W.	4	100	1	0	0	0	0	0	0	100	5	0	0	50	7	0	0	0	0	50	7	25	5	75	4	0	0	25	6
Jackson (State Prison)	4	100	1	----	----	----	.	----	----	100	5	----		----	----	----		----	----	75	7	100	2	----	----	----	----	----	----
Kalamazoo	4	100	4	0	0	0	0	0	0	100	8	0	0	100	3	0	0	0	0	0	0	100	2	25	3	0	0	0	0
Marshall	4	100	2	0	0	0	0	0	0	50	7	0	0	0	0	0	0	0	0	0	0	75	5	25	6	0	0	0	0
Mendon—H. C. C.	4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	100	3	50	6	0	0
Mendon—E. S.	4	100	1	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sturgis	4	100	2	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	3	50	4	0	0	0	0
Tecumseh	2	100	1	----	----	----	----	----	----	100	3	----	----	----	----	----	--	----	----	----	----	----	----	----	----	----	----	----	----
Three Rivers	4	100	4	0	0	0	0	0	0	100	8	0	0	50	8	100	7	0	0	0	0	100	1	100	7	0	0	0	0
York	4	100		0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0
Ypsilanti	4	0	0	0	0	0	0	0	0	0	0	0	0	100	1	25	3	0	0	0	0	100	2	0	0	0	0	0	0
SOUTH-EASTERN DIV.†	*44*	*78*	*3*	*25*	*5*	*38*	*10*	*83*	*10*	*89*	*7*	*100*	*9*	*58*	*9*	*75*	*3*	*81*	*8*	*75*	*8*	*85*	*2*	*69*	*4*	*69*	*11*	*75*	*12*
Dearborn	4	25	5	25	5	0	0	0	0	0	0	0	0	25	3	100	2	25	2	25	1	25	3	25	4	0	0	0	0
Detroit—L. C.	4	100	2	0	0	25	14	100	8	100	11	0	0	25	16	100	2	100	10	100	14	100	3	100	9	50	16	100	13
Detroit—*E. L.*	4	100	5	0	0	0	0	50	16	100	14	0	0	75	14	100	4	100	10	100	11	100	5	100	1	0	0	100	12
Detroit—W. H. R.	4	100	5	0	0	0	0	0	0	100	8	100	13	100	12	100	1	100	9	100	12	100	3	100	4	100	15	50	16
Milford	4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
Monroe—*E. D.*	4	100	4	0	0	50	6	0	0	100	5	100	5	100	2	25	6	0	0	0	0	100	1	100	5	100	6	50	6
Northville	4	25	4	0	0	0	0	0	0	50	4	0	0	0	0	25	3	0	0	0	0	75	1	0	0	0	0	0	0
Pontiac—W. G. E.	4	100	1	0	0	0	0	100	5	100	6	0	0	0	0	100	5	0	0	100	6	100	3	0	0	25	6	0	0
Utica—G. G. R.	4	75	2	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	0	0	25	2	0	0	0	0
Walled Lake	4	0	0	0	0	0	0	0	0	100	4	0	0	25	5	75	3	0	0	0	0	100	1	75	2	0	0	0	0
Wyandotte—E. P. C.	4	50	3	0	0	0	0	0	0	50	2	0	0	0	0	50		0	0	25	3	50	1	25	3	0	0	0	0

* For names of observers, see Exhibit 31, pages 420-1; for comments on the table, see pages 399, 403, 421.
† For counties in each division see Exhibit 1, page 153. The numbers on this line are an average for the division.
‡, §, ||. For explanations of the methods of compiling this table see foot-notes on page 449.

TABLE 3.—*Diseases, by Localities in Michigan, Four Weeks ending* **March** *30, 1878*—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Influenza. Per ct. of Weeks Present.‡	Influenza. Av. Ord. of Prev. when Present.§	Measles. Per ct. of Weeks Present.‡	Measles. Av. Ord. of Prev. when Present.§	Neuralgia.¶ Per ct. of Weeks Present.‡	Neuralgia.¶ Av. Ord. of Prev. when Present.§	Pneumonia. Per ct. of Weeks Present.‡	Pneumonia. Av. Ord. of Prev. when Present.§	Puerperal Fever. Per ct. of Weeks Present.‡	Puerperal Fever. Av. Ord. of Prev. when Present.§	Rheumatism. Per ct. of Weeks Present.‡	Rheumatism. Av. Ord. of Prev. when Present.§	Scarlatina. Per ct. of Weeks Present.‡	Scarlatina. Av. Ord. of Prev. when Present.§	Smallpox. Per ct. of Weeks Present.‡	Smallpox. Av. Ord. of Prev. when Present.§	Tonsilitis.¶ Per ct. of Weeks Present.‡	Tonsilitis.¶ Av. Ord. of Prev. when Present.§	Whooping-cough. Per ct. of Weeks Present.‡	Whooping-cough. Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	274	82	2.7	69	5.8	50	3.0	82	3.8	50	6.3	88	4.0	67	5.0	0	0	75	3.4	82	4.6
UPPER-PENINSULAR DIV.†	*8*	*100*	*1*	*100*	*2*	*25*	*7*	*75*	*6*	*0*	*0*	*100*	*6*	*100*	*4*	....	....	*100*	*7*	*100*	*4*
Calumet	4	....	....	100	2	....	....	75	7	....	....	100	3	100	4	....	....	....	....	100	4
Houghton ...a	4	100	1	....	....	25	7	75	5	....	....	100	9	100	4	....	....	100	7	....	....
NORTH EASTERN D V †	*4*	*25*	*2*	*0*	*0*	....	....	*25*	*3*	*0*	*0*	*75*	*2*	*0*	*0*	*0*	*0*	*25*	*2*	*0*	*0*
Alpena ...b	4	25	2	0	0	....	....	25	3	0	0	75	2	0	0	0	0	25	2	0	0
WESTERN DIVISION	*14*	*75*	*2*	*0*	*0*	....	....	*50*	*3*	*0*	*0*	*71*	*4*	*88*	*4*	*0*	*0*	....	....	*25*	*6*
Coopersville	2	....	....	....	....	....	....	....	....	....	....	50	4	....	....	....	....	....	....	....	....
Grand Haven	4	100	2	0	0	....	....	75	3	0	0	100	4	0	0	0	0	....	....	25	6
Grand Rapids ...c	4	100	2	0	0	....	....	0	0	0	0	25	6	75	6	0	0	....	....	0	0
Holland ...d	4	25	2	0	0	....	....	25	2	0	0	100	3	100	2	0	0	....	....	0	0
CENTRAL DIVISION	*51*	*75*	*3*	*50*	*3*	....	....	*78*	*4*	*75*	*8*	*89*	*4*	*50*	*4*	*0*	*0*	....	....	*83*	*4*
Charlotte (city)	4	100	2	0	0	....	....	100	6	75	9	100	3	0	0	0	0	....	....	0	0
Charlotte	4	100	2	0	0	....	....	100	6	100	10	100	4	0	0	0	0	....	....	0	0
DeWitt ...e	4	0	0	50	3	....	....	75	3	0	0	100	3	0	0	0	0	....	....	0	0
Elsie	4	0	0	0	0	....	....	50	3	0	0	0	0	100	1	0	0	....	....	0	0
Hastings	4	100	3	0	0	....	....	0	0	0	0	0	0	0	0	0	0	....	....	100	1
Howell	4	75	4	0	0	....	....	50	5	0	0	100	5	25	6	0	0	....	....	0	0
Hubbardston ...f	4	25	4	0	0	....	....	100	5	0	0	100	7	50	8	0	0	....	....	100	6
Ionia	4	50	5	0	0	....	....	0	0	0	0	0	0	0	0	0	0	....	....	0	0
Lansing	3	....	....	....	....	....	....	....	....	....	....	33	2	....	....	....	....	....	....	....	....
Mason	4	0	0	0	0	....	....	75	3	0	0	100	3	75	2	0	0	....	....	0	0
North Lansing ...g	4	0	0	0	0	....	....	100	2	50	4	50	4	25	3	0	0	....	....	50	4
Otisville	4	0	0	0	0	....	....	0	0	0	0	100	4	0	0	0	0	....	....	0	0
Ovid	4	0	0	0	0	....	....	50	4	0	0	0	0	25	2	0	0	....	....	0	0
NORTH'N-CENTRAL DIV.†	*3*	*100*	*3*	*0*	*0*	....	....	*0*	*0*	*0*	*0*	*100*	*4*	*0*	*0*	*0*	*0*	....	....	*0*	*0*
Big Rapids—*W. S. W.* ...h	3	100	3	0	0	....	....	0	0	0	0	100	4	0	0	0	0	....	....	0	0
BAY AND EASTERN DIV.†	*48*	*87*	*3*	*0*	*0*	....	....	*85*	*4*	*25*	*6*	*88*	*4*	*74*	*5*	*0*	*0*	....	....	*100*	*6*
Bay City—W. H. B.	4	100	3	0	0	....	....	0	0	0	0	100	5	100	6	0	0	....	....	0	0
Bay City—W. R. M. ...i	4	100	4	0	0	....	....	100	5	0	0	100	7	100	7	0	0	....	....	0	0
East Saginaw—N. H. C.	4	0	0	0	0	....	....	100	5	0	0	100	4	100	3	0	0	....	....	0	0
East Saginaw—S. K.	4	0	0	0	0	....	....	100	3	0	0	100	3	100	8	0	0	....	....	0	0
East Saginaw—*M. J. L.* ...j	4	0	0	0	0	....	....	25	2	0	0	25	2	75	2	0	0	....	....	0	0
Lapeer—*H. McC.* ...k	2	0	0	0	0	....	....	0	0	0	0	100	3	50	4	0	0	....	....	0	0
Lapeer—A. N.	3	100	1	0	0	....	....	100	4	0	0	67	10	0	0	0	0	....	....	0	0
Lexington	3	0	0	0	0	....	....	100	2	0	0	0	0	0	0	0	0	....	....	0	0
Port Huron—H. R. M.	2	0	0	0	0	....	....	0	0	0	0	0	0	50	2	0	0	....	....	0	0
Port Huron—*A. A. W.* ...l	4	100	2	....	....	....	....	50	6	25	6	75	5	....	....	....	....	....	....	100	6
Saginaw City—N. D. L.	4	0	0	0	0	....	....	100	4	0	0	100	2	25	6	0	0	....	....	0	0
Saginaw City—*I. N. S.* ...m	4	100	3	....	....	....	....	100	6	....	....	100	3	75	7	....	....	....	....	....	....

DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.		For Cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
a	Croup	75	8
	Cerebral meningitis	50	6
	Gastro-hepatic catarrh	75	4
	Pharyngitis	50	7
b	Catarrh	25	1
	Hemiplegia	25	3
	Puerperal mania	25	3
c	Dyspepsia	75	3
	Dyspeptic sore throat	25	3
d	Bilious fever	50	1
	Fever, inflammatory	25	3
	Congestive chills	25	3
e	Colic, mumps, and hematuria, each	25	3
	Dysmenorrhea	25	4
	Jaundice	25	4
	Pharyngitis	100	1
f	Catarrh	100	4
	Catarrhal opthalmia	75	4
	Headache	25	6
g	Abscess	50	4
	Albuminuria	50	4
	Enteritis	25	4
	Mumps	25	3
	Pleurisy	25	4
h,i	See notes *h* and *i* for M'ch, p. 470.		
j	Gastric fever	75	2
	Jaundice	25	2
k	See note *k* for March, p. 470.		
l	Cancer of stomach	100	6
m	No severe case of any disease, Mar. 9. But little sickness, Mar. 30.		
n	Myelitis	67	4
	Peritonitis	33	6
	Less sickness here than I have ever known before, Mar. 9.		

St. Clair	2	0	0	0	0	----	----	100	4	0	0	0	0	50	4	0	0	----	----	0	0		Five cases of diphtheria reported in one family, with two deaths, week ending Mar. 30.		
Thornville	4	25	3	0	0	----	----	75	5	0	0	100	5	50	8	0	0	----	----	0	0	o			
SOUTH-WESTERN DIV.†	*35*	*74*	*2*	*0*	*0*	*25*	*2*	*85*	*3*	*25*	*2*	*89*	*4*	*52*	*4*	*0*	*0*	*75*	*2*	*0*	*0*				
Allegan	4	0	0	0	0	----	----	50	4	0	0	100	3	75	4	0	0	----	----	0	0				
Dowagiac—*H. S. McM.*	4	75	6	0	0	----	----	100	3	0	0	100	5	0	0	0	0	----	----	0	0		Cancer	25	3
Mattawan ..... *n*	3	67	2	0	0	----	----	67	2	0	0	100	3	67	1	0	0	----	----	0	0		Cancer, epithel.	25	2
Niles—S. B. ..... *o*	4	100	1	0	0	----	----	100	3	0	0	100	8	25	10	0	0	----	----	0	0		Cancer of uterus, metrorrhagia, vaginitis, and herpes zoster, each		
Niles—*O. P. H.*	4	75	2	0	0	----	----	100	2	0	0	100		25	1	0	0	----	----	0	0				
Niles—J. S. R.	4	75	2	0	0	----	----	100	3	0	0	100	4	75	6	0	0	----	----	0	0	*p*		50	3
Otsego	4	0	0	0	0	----	----	0	0	0	0	50	2	50	3	----	----	----	----	----	----		Meningitis	25	2
Paw Paw ..... *p*	4	100	2	0	0	25	2	75	1	25	2	50	3	0	0	0	0	75	2	0	0		Gonorrhea	100	2
St. Joseph ..... *q*	4	25	2	0	0	----	----	0	0	0	0	100	2	0	0	0	0	----	----	0	0		Nephritis	25	2
SOUTH'N-CENTRAL DIV.†	*67*	*86*	*2*	*25*	*6*	*50*	*2*	*96*	*3*	*0*	*0*	*88*	*4*	*50*	*5*	*0*	*0*	*88*	*3*	*100*	*6*		Pleuritis	25	2
Adrian	4	75	3	0	0	----	----	0	0	0	0	25	3	0	0	0	0	----	----	0	0		All endemic diseases less prevalent, Mar. 9.		
Albion	2	100	2	0	0	----	----	100	7	0	0	100	6	50	3	0	0	----	----	0	0	*q*			
Ann Arbor—W. F. B.	4	100	3	0	0	----	----	100	3	0	0	100	7	100	6	0	0	----	----	0	0	*r*	Laryngitis	75	1
Brooklyn	4	0	0	0	0	----	----	75	2	0	0	0	0	0	0	0	0	----	----	0	0		See note *r* for Mar., below.		
Clinton	3	67		0	0	----	----	100	2	0	0	100	3	0	0	0	0	----	----	0	0	*s*	Syphilis	100	5
Coldwater	4	75	1	0	0	----	----	100	2	0	0	100		0	0	0	0	----	----	0	0	*t*	Not much sickness, and that mild, Mar. 9.		
Hudson	4	100	3	0	0	----	----	100	3	0	0	100	4	25	5	0	0	----	----	0	0				
Jackson—W. W. ..... *r*	4	100		25	6	----	----	100	2	0	0	100	3	0	0	0	0	75	1	0	0	*u*	Dyspepsia	50	2
Jackson (State Prison) .. *s*	4	----		----	----	----	----	----	----	----	----	100	3	----	----	----		100	5	----	----	*v*	See note *v* for March, below.		
Kalamazoo	4	100		0	0	----	----	100	5	0	0	0	0	50	8	0	0	----	----	100	6		Dyspepsia	100	3
Marshall	4	100		0	0	----	----	75	3	0	0	100	4	0	0	0	0	----	----	0	0	*w*	Pharyngitis	25	3
Mendon—H. C. C. ..... *t*	4	0	0	0	0	----	----	100	4	0	0	100	4	0	0	0	0	----	----	0	0		See note *w* for Mar., p. 439.		
Mendon—E. S. ..... *u*	4	0	0	0	0	25	2	0	0	0	0	100	2	25	2	0	0	----	----	0	0	*x*	See note *x* for March, p. 439.		
Sturgis	4	0	0	0	0	----	----	100	2	0	0	50	6	0	0	0	0	----	----	0	0		Broncho-pneumonia	100	10
Tecumseh ..... *v*	2	----		----	----	----	----	----	----	----	----	100	2	----	----	----		----	----	----	----		The diarrhea so prevalent the last two weeks, I believe to be of malarial origin.		
Three Rivers ..... *w*	4	50	8	0	0	100	3	0	0	0	0	100	5	0	0	0	0	----	----	0	0	*y*			
York	4	0	0	0	0	25	1	100	2	0	0	100	2	0	0	0	0	----	----	0	0				
Ypsilanti ..... *x*	4	0	0	0	0	----	----	0	0	0	0	50	3	0	0	0	0	----	----	0	0				
SOUTH-EASTERN DIV.†	*44*	*88*	*3*	*100*	*12*	*100*	*3*	*81*	*5*	*25*	*7*	*89*	*4*	*83*	*8*	*0*	*0*	----	----	*81*	*5*	*z*	See note *z* for March, p. 439.		
Dearborn	4	50	1	0	0	----	----	25	2	0	0	50	3	0	0	0	0	----	----	0	0	*aa*	Asthma	100	5
Detroit—L. C.	4	100	5	100	12	----	----	100	7	0	0	100	5	100	13	0	0	----	----	100	8		Consumption	25	4
Detroit—*E. L.* ..... *y*	4	100	3	0	0	----	----	100	12	0	0	100	6	100	8	0	0	----	----	100	5		Inflammatory consumpt'n.	25	4
Detroit—W. H. R. ..... *z*	4	100	8	0	0	----	----	100	6	0	0	100	10	100	13	0	0	----	----	100	2	*bb*	Mumps	25	1
Milford	4	100	2	0	0	----	----	75	4	----	----	100	5	75	5	0	0	----	----	0	0		Diarrhea malarious, malarial type to everything, week ending March 9.		
Monroe—*E. D.* ..... *aa*	4	100	3	0	0	100	3	100	5	0	0	100	4	75	5	0	0	----	----	25	3				
Northville ..... *bb*	4	100	2	0	0	----	----	0	0	0	0	100	3	0	0	0	0	----	----	0	0				
Pontiac—W. G. E. ..... *cc*	4	100	2	0	0	----	----	100	3	0	0	100		0	0	0	0	----	----	0	0	*cc*	Spasmodic croup	25	5
Utica—G. G. R. ..... *dd*	4	100	1	0	0	----	----	100	5	25	7	100	4	0	0	0	0	----	----	0	0	*dd*	Dyspepsia	100	3
Walled Lake	4	25	5	0	0	----	----	25	2	0	0	25	3	0	0	0	0	----	----	0	0		See note *dd* for Mar., p. 443.		
Wyandotte—E. P. C.	4	0	0	0	0	----	----	0	0	0	0	100	2	50	2	0	0	----	----	0	0				

* For names of observers, see Exhibit 31, pages 420-1.

†, ‡, §, ‖, ¶, *a*, *b*, *c*, etc. For these references, see page 449.

r From about last August up to the present time there has been a cerebro-spinal congestive type in all the remittent fever that I have handled, sometimes particularly severe, March 28.

v The cases of scarlet fever reported occurred in the town of Raisin, some six miles from this place, were apparently sporadic, occurring only in the children of one family. No others in the vicinity that I could learn had it. The disease was mild and of the anginose variety. In one case otorrhea occurred as a sequela, affecting both ears; in another, inflammation of cervical glands. The premises were in excellent sanitary condition. Rheumatism has prevailed very generally here this winter, and although mild in most instances has been very persistent and continuous.—March 20.

NOTE.—"I can report healthful during the weeks ending Saturday, Feb. 2, 9, 16, 23, and March 2, 9, and 16, 1878. During the week ending Saturday, March 23, there have been a few cases of sore throat (mild), not diphtheria."—*J. M. Loop, Port Sanilac, March 28, 1878.*

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **April** *27, 1878.*

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.	
		Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	241	89	2.6	25	5.5	42	7.7	39	6.8	93	4.9	53	7.5	58	6.5	65	4.5	70	6.8	72	6.2	90	2.3	73	3.3	43	8.8	75	5.2
UPPER-PENIN. DIVISION†	*8*	*100*	*3*	*0*	*0*	*0*	*0*	*25*	*5*	*63*	*6*	*25*	*8*	*0*	*0*	*88*	*5*	*100*	*5*	*38*	*6*	*0*	*0*	*100*	*1*	*0*	*0*	*0*	*0*
Calumet	4	----	----	----	----	----	----	25	5	25	5	----	----	----	----	100	4	100	5	50	4	----	----	100	1	----	----	----	----
Houghton	4	100	3	0	0	0	0	0	0	100	7	25	8	0	0	75	6	0	0	25	7	0	0	0	0	0	0	0	0
NORTH-EASTERN DIV.†	*4*	*100*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*25*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Alpena	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	25	3	0	0	0	0	0	0	0	0	0	0	0	0
WESTERN DIVISION†	*11*	*57*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*5*	*0*	*0*	*0*	*0*	*100*	*5*	*0*	*0*	*25*	*3*	*73*	*4*	*91*	*1*	*0*	*0*	*0*	*0*
Grand Haven	4	25	1	0	0	0	0	0	0	0	0	0	0	0	0	100	5	0	0	0	0	100	5	75	2	0	0	0	0
Grand Rapids	3	100	3	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	5	100	1	0	0	0	0
Holland	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	3	25	3	100	1	0	0	0	0
CENTRAL DIVISION†	*44*	*88*	*2*	*25*	*2*	*75*	*10*	*0*	*0*	*100*	*4*	*0*	*0*	*42*	*6*	*44*	*4*	*25*	*3*	*50*	*5*	*95*	*2*	*66*	*3*	*0*	*0*	*100*	*4*
Charlotte	4	100	2	0	0	75	10	0	0	100	10	0	0	75	9	100	4	0	0	0	0	100	4	100	7	0	0	100	8
DeWitt	4	100	1	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	2	75	2	0	0	0	0
Elsie	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	25	4	0	0	100	2
Hastings	4	0	0	0	0	0	0	0	0	100	4	0	0	25	5	0	0	0	0	0	0	100	2	0	0	0	0	0	0
Howell	4	100	1	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	50	2	0	0	0	0	0	0
Hubbardston	4	0	0	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	1	50	2	0	0	0	0
Ionia	4	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
Lansing	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100	1	50	2	----	----	100	1
North Lansing	4	75	3	0	0	0	0	0	0	100	2	0	0	0	0	25	5	0	0	0	0	100	1	0	0	0	0	0	0
Otisville	4	50	2	0	0	0	0	0	0	100	1	0	0	25	5	25	4	0	0	50	5	100	2	25	3	0	0	0	0
Ovid	4	100	3	25	2	0	0	0	0	0	0	0	0	0	0	25	3	25	3	0	0	0	0	100	1	0	0	0	0
NORTHERN-CENTRAL DIV.†	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*50*	*5*	*0*	*0*	*0*	*0*	*100*	*3*	*100*	*3*	*0*	*0*	*0*	*0*
Big Rapids—*W. S. W.*	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	5	0	0	0	0	100	3	100	3	0	0	0	0
BAY AND EASTERN DIV.†	*43*	*92*	*3*	*25*	*9*	*25*	*5*	*25*	*7*	*100*	*6*	*75*	*8*	*70*	*6*	*60*	*5*	*38*	*8*	*64*	*7*	*93*	*2*	*81*	*3*	*36*	*7*	*65*	*5*
Bay City—W. H. B.	4	75	7	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	50	6
Bay City—W. R. M. *j*	4	100	2	0	0	0	0	0	0	100	9	100	8	100	9	0	0	0	0	0	0	100	1	100	4	0	0	50	8
East Saginaw—N. H. C.	4	100	2	0	0	0	0	0	0	100	6	0	0	50	6	25	6	0	0	0	0	100	1	0	0	0	0	25	6
East Saginaw—S. K. *k*	3	100	1	0	0	0	0	0	0	100	8	0	0	67	8	0	0	0	0	33	7	100	4	100	3	33	11	67	4
East Saginaw—*M. J. L.*	4	50	2	0	0	0	0	0	0	100	3	0	0	75	2	0	0	0	0	0	0	75	2	75	2	25	3	75	8
Lapeer—A. N.	4	100	4	0	0	0	0	25	8	100	9	0	0	50	8	100	7	50	10	50	9	100	4	100	6	0	0	75	5
Port Huron—*A. A. W.*	4	100	2	----	----	25	5	25	5	100	5	----	----	----	----	----	----	----	----	----	----	100	2	50	3	----	----	----	----
Port Sanilac	4	0	0	0	0	0	0	0	0	0	0	0	0	----	----	0	0	0	0	0	0	75	1	25	1	0	0	0	0
Saginaw City—N. D. L.	4	100	3	0	0	0	0	0	0	100	3	0	0	75	4	50	4	0	0	0	0	100	1	0	0	0	0	0	0
Saginaw City—*I. N. S.*	4	100	3	25	9	----	----	----	----	100	3	50	8	75	7	25	6	25	6	100	6	75	2	100	5	50	7	100	7
Thornville	4	100	2	0	0	0	0	0	0	100	7	0	0	0	0	100	3	0	0	0	0	100	1	0	0	0	0	75	4
SOUTH-WESTERN DIV.†	*28*	*68*	*2*	*0*	*0*	*0*	*0*	*67*	*8*	*100*	*4*	*25*	*3*	*43*	*4*	*25*	*3*	*0*	*0*	*64*	*4*	*88*	*2*	*45*	*4*	*0*	*0*	*63*	*3*
Allegan	4	100	1	0	0	0	0	0	0	100	3	0	0	0	0	25	4	0	0	0	0	100	2	50	5	0	0	0	[illegible]

Dowagiac—*C. W. M.*	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100	1	----	----	----	----	----	----	----
Mattawan	3	0	0	0	0	0	0	0	0	100	3	0	0	33	4	0	0	0	0	67	3	0	0	0	0	0	0	0	0	0
Niles—*O. P. H.*	4	75	3	0	0	0	0	0	0	100	4	25	3	75	2	0	0	0	0	100	3	100	2	0	0	0	0	0	0	0
Niles—J. S. R. *q*	3	100	3	----	----	----	----	67	8	100	6	----	----	33	7	----	----	----	----	----	----	100	4	33	5	----	----	----	----	----
Otsego	4	25	2	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	25	5	100	1	0	0	0	0	0	0	0
Paw Paw	4	0	0	0	0	0	0	0	0	100	3	0	0	0	0	25	3	0	0	0	0	100	2	50	2	0	0	50	3	3
St. Joseph	4	50	1	0	0	0	0	0	0	100	2	0	0	25	2	25	2	0	0	0	0	25	2	0	0	0	0	75	3	3
SOUTHERN-CENTRAL DIV.†	*60*	*92*	*3*	*0*	*0*	*25*	*8*	*100*	*8*	*83*	*5*	*50*	*6*	*55*	*5*	*83*	*5*	*63*	*4*	*92*	*6*	*92*	*2*	*67*	*4*	*25*	*6*	*100*	*5*	*0*
Adrian	4	100	2	0	0	0	0	0	0	25	1	0	0	25	3	0	0	25	2	100	3	100	2	0	0	0	0	0	0	0
Albion	4	100	3	0	0	25	8	100	8	100	2	0	0	25	9	100	7	100	6	100	5	100	2	100	3	0	0	0	0	0
Ann Arbor—W. F. B.	2	100	2	0	0	0	0	0	0	100	9	0	0	0	0	0	0	0	0	50	8	100	5	100	6	0	0	0	0	0
Brooklyn	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0
Clinton	2	50	5	0	0	0	0	0	0	100	8	100	8	50	5	0	0	0	0	100	7	100	1	50	4	0	0	100	5	0
Coldwater	4	100	3	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0
Jackson—W. W.	4	100	2	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	4	75	6	0	0	0	0	0
Jackson (State Prison)	4	100	1	----	----	----	----	----	----	50	6	----	----	----	----	----	----	----	----	----	----	100	4	----	----	----	----	----	----	----
Kalamazoo	4	100	4	0	0	0	0	0	0	100	8	0	0	100	4	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0
Marshall	4	100	1	0	0	0	0	0	0	50	6	0	0	0	0	0	0	0	0	0	0	75	4	50	5	0	0	0	0	0
Mendon—H. C. C.	4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	100	2	25	6	0	0	0
Mendon—E. S.	4	100	2	0	0	0	0	0	0	75	3	0	0	0	0	50	2	0	0	0	0	25	1	0	0	0	0	0	0	0
Sturgis	4	75	2	0	0	0	0	0	0	100	3	25	4	0	0	0	0	0	0	0	0	100	2	50	3	0	0	0	0	0
Three Rivers	4	100	3	0	0	0	0	0	0	100	9	0	0	50	8	100	7	0	0	0	0	100	2	100	8	0	0	0	0	0
York	4	100	3	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	1	25	4	0	0	0	0	0
Ypsilanti	4	25	2	0	0	0	0	0	0	0	0	0	0	75	1	0	0	0	0	0	0	75	1	25	2	0	0	0	0	0
SOUTH-EASTERN DIV.†	*39*	*94*	*3*	*0*	*0*	*0*	*0*	*25*	*7*	*100*	*5*	*56*	*9*	*67*	*12*	*95*	*4*	*100*	*10*	*100*	*9*	*85*	*2*	*80*	*3*	*63*	*13*	*80*	*8*	
Detroit—L. C.	4	100	4	0	0	0	0	25	11	100	5	0	0	25	15	100	4	100	11	100	9	100	2	100	8	0	0	100	11	
Detroit—*E. L.*	4	100	8	0	0	0	0	0	0	100	11	75	11	75	15	100	6	100	8	100	14	100	2	100	1	25	14	100	12	
Detroit—W. H. R.	4	100	4	0	0	0	0	0	0	100	7	100	15	100	13	100	3	100	10	100	11	100	2	100	1	100	12	0	0	
Milford	4	100	2	0	0	0	0	0	0	0	0	25	6	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0	
Northville	4	75	3	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100		0	0	----	----	----	----	
Pontiac—W. G. E.	4	100	1	0	0	0	0	25	5	100	6	0	0	0	0	100	5	0	0	100	5	100	3	0	0	0	0	0	0	
Utica—G. G. R.	4	100	3	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	25	7	0	0	0	0	0	0	
Walled Lake	4	0	0	0	0	0	0	25	4	100	3	0	0	0	0	0	0	0	0	0	0	75	2	75	3	0	0	25	3	
Washington	3	67	4	0	0	0	0	0	0	100	3	0	0	67	5	67	4	0	0	100	4	67	3	0	0	0	0	100	5	
Wyandotte—E. P. C.	4	100	2	0	0	0	0	0	0	100	2	25	4	----	----	0	0	0	0	0	0	75	1	25	3	0	0	0	0	

* For names of observers, see Exhibit 31, pages 420–1; for comments on the table, see pages 399, 403, 421.

† For counties in each division, see Exhibit 1, page 153. The numbers in this line are an average for the division.

‡, §, ‖. For these references, see foot-notes on page 449.

j Little change; the air-passages are in an excited condition, catarrhs common.—April 6. No marked changes; less irritation of the membranes of the throat, April 13. No sickness and no marked change, April 20. No change to note, April 27.—*W. R. Marsh, M. D., Bay City.*

k More than the usual amount of lung troubles here this spring. Many cases of broncho-pneumonia. More typho-malarial fevers than is usual at this season of the year. Also a very few cases of scarlatina.—*Samuel Ritchen, M. D., East Saginaw*, April 22.

q During the past two weeks we have had influenza and the whole range of inflammation of the respiratory tract, catarrh, coryza, stomatitis, glossitis, pharyngitis, tonsilitis, laryngitis, tracheitis, bronchitis, pneumonia, pleuro-pneumonia, and pleuritis. * * * There is a large number of cases of chronic diseases in Niles and its vicinity, carcinoma, ovarian dropsy, uterine leucorrhea, anemia, leukemia, chronic gastritis, and gastro-duodenitis, hypertrophy of the spleen, apoplexy, tuberculosis, and softening of the brain. There is a mixed fever common in this valley, exceedingly mild, to which the term *bilious* is applied. It is not remittent fever, but is undoubtedly typho-malarial, and requires but little treatment.—*J. S. Reeves, M. D., Niles*, April 16.

TABLE 3.—*Diseases by Localities in Michigan, Four Weeks ending* **April** *27, 1878*—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Influenza. Per ct. of Weeks Present.++	Influenza. Av. Ord. of Prev. when Present.§	Measles. Per ct. of Weeks Present.++	Measles. Av. Ord. of Prev. when Present.§	Neuralgia.¶ Per ct. of Weeks Present.++	Neuralgia.¶ Av. Ord. of Prev. when Present.§	Pneumonia. Per ct. of Weeks Present.++	Pneumonia. Av. Ord. of Prev. when Present.§	Puerperal Fever. Per ct. of Weeks Present.++	Puerperal Fever. Av. Ord. of Prev. when Present.§	Rheumatism. Per ct. of Weeks Present.++	Rheumatism. Av. Ord. of Prev. when Present.§	Scarlatina. Per ct. of Weeks Present.++	Scarlatina. Av. Ord. of Prev. when Present.§	Small-pox. Per ct. of Weeks Present.++	Small-pox. Av. Ord. of Prev. when Present.§	Tonsilitis.¶ Per ct. of Weeks Present.++	Tonsilitis.¶ Av. Ord. of Prev. when Present.§	Whooping-cough. Per ct. of Weeks Present.++	Whooping-cough. Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	241	87	2.9	67	5.3	53	3.2	76	4.2	25	3.0	86	3.9	75	6.2	0	0	48	4.1	68	5.0
UPPER-PENINSULAR DIV.†	*8*	*63*	*2*	*50*	*3*	----	----	*100*	*5*	*0*	*0*	*88*	*5*	*100*	*3*	*0*	*0*	*50*	*6*	*25*	*4*
Calumet	4	25	3	50	3	----	----	100	5	----	----	100	3	100	2	----	----	----	----	25	4
Houghton ..... *a*	4	100	1	0	0	----	----	100	4	0	0	75	6	100	3	0	0	50	6	0	0
NORTH-EASTERN DIV.†	*4*	*100*	*1*	*0*	*0*	----	----	*50*	*4*	*0*	*0*	*25*	*3*	*0*	*0*	*0*	*0*	*25*	*3*	*0*	*0*
Alpena ..... *b*	4	100	1	0	0	----	----	50	4	0	0	25	3	0	0	0	0	25	3	0	0
WESTERN DIVISION†	*11*	*91*	*2*	*0*	*0*	----	----	*55*	*3*	*0*	*0*	*73*	*4*	*86*	*4*	*0*	*0*	----	----	*0*	*0*
Grand Haven	4	100	2	0	0	----	----	75	3	0	0	100	4	0	0	0	0	----	----	0	0
Grand Rapids ..... *c*	3	100	2	0	0	----	----	67	4	0	0	33	6	67	6	0	0	----	----	0	0
Holland ..... *d*	4	75	3	0	0	----	----	25	3	0	0	75	2	100	2	0	0	----	----	0	0
CENTRAL DIVISION†	*44*	*65*	*3*	*0*	*0*	----	----	*57*	*4*	*0*	*0*	*75*	*3*	*100*	*2*	*0*	*0*	----	----	*75*	*5*
Charlotte	4	100	2	0	0	----	----	100	6	0	0	100	4	0	0	0	0	----	----	0	0
DeWitt ..... *e*	4	0	0	0	0	----	----	75	3	0	0	100	1	0	0	0	0	----	----	0	0
Elsie	4	0	0	0	0	----	----	0	0	0	0	0	0	100	2	0	0	----	----	0	0
Hastings	4	100	3	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	100	2
Howell ..... *f*	4	0	0	0	0	----	----	0	0	0	0	75	4	0	0	0	0	----	----	0	0
Hubbardston ..... *g*	4	50	3	0	0	----	----	50	3	0	0	100	4	0	0	0	0	----	----	50	8
Ionia ..... *h*	4	0	0	0	0	----	----	25	4	0	0	0	0	0	0	0	0	----	----	0	0
Lansing	4	25	3	----	----	----	----	----	----	----	----	25	3	----	----	----	----	----	----	----	----
North Lansing ..... *i*	4	0	0	0	0	----	----	100	4	0	0	50	4	0	0	0	0	----	----	0	0
Otisville	4	0	0	0	0	----	----	25	3	0	0	75	4	0	0	0	0	----	----	0	0
Ovid	4	50	4	0	0	----	----	25	2	0	0	0	0	0	0	0	0	----	----	0	0
NORTH'N-CENTRAL DIV.†	*4*	*100*	*2*	*50*	*3*	----	----	*0*	*0*	*0*	*0*	*100*	*5*	*0*	*0*	*0*	*0*	----	----	*0*	*0*
Big Rapids—*W. S. W.*	4	100	2	50	3	----	----	0	0	0	0	100	5	0	0	0	0	----	----	0	0
BAY AND EASTERN DIV.†	*43*	*81*	*4*	*0*	*0*	----	----	*79*	*4*	*0*	*0*	*85*	*5*	*58*	*6*	*0*	*0*	*67*	*10*	*25*	*4*
Bay City—W. H. B.	4	100	3	0	0	----	----	0	0	0	0	100	4	50	7	0	0	----	----	0	0
Bay City—W. R. M. ..... *j*	4	100	4	0	0	----	----	100	6	0	0	100	7	100	8	0	0	----	----	0	0
East Saginaw—N. H. C.	4	0	0	0	0	----	----	100	4	0	0	25	4	75	4	0	0	----	----	0	0
East Saginaw—S. K. ..... *k*	3	67	4	0	0	----	----	100	6	0	0	100	6	0	0	0	0	67	10	0	0
East Saginaw—*M. J. L.*	4	50	4	0	0	----	----	75	3	0	0	75	3	0	0	0	0	----	----	0	0
Lapeer—A. N.	4	100	1	0	0	----	----	100	3	0	0	100	8	0	0	0	0	----	----	0	0
Port Huron—*A. A. W.* ..... *l*	4	50	6	----	----	----	----	50	6	----	----	75	5	----	----	----	----	----	----	25	4
Port Sanilac ..... *m*	4	0	0	0	0	----	----	25	2	0	0	0	0	0	0	0	0	----	----	0	0
Saginaw City—N. D. L.	4	0	0	0	0	----	----	100	4	0	0	75	2	25	2	0	0	----	----	0	0
Saginaw City—*I. N. S.* ..... *n*	4	100	4	----	----	----	----	100	5	----	----	100	3	75	6	----	----	----	----	----	----
Thornville	4	0	0	0	0	----	----	50	5	0	0	100	5	25	7	0	0	----	----	25	3
SOUTH-WESTERN DIV.†	*28*	*100*	*2*	*0*	*0*	*25*	*3*	*79*	*4*	*0*	*0*	*93*	*3*	*64*	*4*	*0*	*0*	*25*	*3*	*50*	*3*
Allegan ..... *o*	4	0	0	0	0	----	----	50	7	0	0	100	4	50	7	0	0	----	----	0	0
Dowagiac—*C. W. M.*	2	100	2	----	----	----	----	----	----	----	----	100	3	----	----	----	----	----	----	----	----
Mattawan ..... *p*	3	100	1	0	0	----	----	0	0	0	0	100	2	67	2	0	0	----	----	0	0

	DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Present.++	Av. Order of Prevalence when Present.§
a	Croup	25	6
b	Angina pectoris, metro-peritonitis, nephritis, and puerperal mania, each	25	3
c	Sore throat (not malignant)	33	4
d	Bilious fever	50	3
e	Asthma, chicken-pox, and parotitis, each	50	3
	Dysmenorrhea	25	4
	Metrorrhagia	50	4
	Hysteralgia, orchitis, and strangury, each	25	3
	Pharyngitis	50	2
f	Chronic diseases most prevalent, 3 weeks ending April 20.		
g	Catarrhal ophthalmia	50	6
h	Diseases are scarce, April 13.		
i	Mumps	25	3
j	See note *j* for April, p. 435.		
k	See note *k* for April, p. 435.		
l	Cancer	25	6
m	Diphtheritic croup	25	2
n	Generally healthy, Apr. 6. Very little sickness, 2 w'ks ending April 20.		
o	Croup, spasmodic	25	5
p	Myelitis	67	5
q	See note *q* for April, p. 435.		
r	But little sickness, 3 weeks ending April 20.		
s	Cancer of breast, cystitis, gastric fever, strangury, nephritis, and gonorrhea, each	25	3
	Cancer of uterus	100	3
	Metrorrhagia, dyspepsia, hemorrhoids, and spermatorrhea, each	25	2
	Paralysis	75	3
	Vaginitis	50	3

Niles—*O. P. H.*	4	100	2	0	0	----	----	100	2	0	0	100	3	0	0	0	0	----	----	0	0	*t*	Alcoholism	25	3
Niles—J. S. R. *q*	3	100	2	----	----	----	----	100	4	----	----	100	3	----	----	----	----	----	----	----	----	*u*	See note *u* for April, below.		
Otsego *r*	4	0	0	0	0	----	----	50	3	0	0	100	3	75	3	0	0	----	----	0	0	*v*	Syphilis	100	5
Paw Paw *s*	4	100	2	0	0	25	3	100	2	0	0	50	3	0	0	0	0	25	3	0	0	*w*	Angina	50	2
St. Joseph *t*	4	0	0	0	0	----	----	0	0	0	0	100	2	0	0	0	0	----	----	50	3		Dyspepsia	25	4
SOUTH'N-CENTRAL DIV.†	*60*	*92*	*3*	*0*	*0*	*58*	*3*	*85*	*3*	*0*	*0*	*90*	*4*	*50*	*9*	*0*	*0*	*67*	*3*	*100*	*6*	*x*	Dyspepsia	100	6
Adrian	4	0	0	0	0	----	----	25	4	0	0	75	3	0	0	0	0	----	----	0	0		Pharyngitis	100	4
Albion *u*	4	100	1	0	0	----	----	100	3	0	0	100	4	25	9	0	0	----	----	0	0		Continues healthy, 4 w'ks ending April 27.		
Ann Arbor—W. F. R.	2	100	2	0	0	----	----	100	3	0	0	100	8	100	8	0	0	----	----	0	0		Bilious fever	25	3
Brooklyn	4	0	0	0	0	----	----	100	3	0	0	50	4	0	0	0	0	----	----	0	0	*y*	No sickness, 2 weeks ending April 13. Fever of a bilious form prevails, April 27.		
Clinton	2	0	0	0	0	----	----	100	3	0	0	100	2	0	0	0	0	----	----	0	0				
Coldwater	4	50	4	0	0	----	----	100	1	0	0	100	2	0	0	0	0	----	----	0	0				
Jackson—W. W.	4	100	1	0	0	----	----	75	3	0	0	100	3	0	0	0	0	75	1	0	0				
Jackson (State Prison) *v*	4	----	----	----	----	25	4	----	----	----	----	100	2	----	----	----	----	100	4	----	----				
Kalamazoo	4	100	1	0	0	----	----	100	5	0	0	75	7	0	0	0	0	----	----	100	6	*z*	Broncho-pneumonia	75	6
Marshall	4	100	2	0	0	----	----	50	6	0	0	100	3	0	0	0	0	----	----	0	0	*aa*	See note *aa* for April, below.		
Mendon—H. C. C.	4	0	0	0	0	----	----	100	5	0	0	100	4	0	0	0	0	----	----	0	0	*bb*	Mumps	75	2
Mendon—E. S. *w*	4	0	0	0	0	50	3	0	0	0	0	75	2	0	0	0	0	25	3	0	0	*cc*	Dyspepsia	100	2
Sturgis	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0	*dd*	Cancer	67	6
Three Rivers *x*	4	100	7	0	0	100	2	0	0	0	0	100	6	0	0	0	0	----	----	0	0		Chicken-pox	33	5
York	4	0	0	0	0	----	----	100	2	0	0	100	3	0	0	0	0	----	----	0	0		Dropsy	33	4
Ypsilanti *y*	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0		General debility	100	2
SOUTH-EASTERN DIV.†	*39*	*94*	*4*	*100*	*10*	*67*	*4*	*82*	*6*	*25*	*3*	*94*	*4*	*94*	*11*	*0*	*0*	*25*	*3*	*94*	*6*		Malarial cachexia	67	4
Detroit—L. C.	4	100	7	100	10	----	----	100	10	0	0	100	7	100	13	0	0	----	----	100	8	*ee*	Pharyngitis	100	2
Detroit—*E. L.* *z*	4	100	4	0	0	----	----	100	11	0	0	100	6	100	15	0	0	----	----	100	5		Urticaria	33	3
Detroit—W. H. R. *aa*	4	100	8	0	0	----	----	100	5	0	0	100	9	100	13	0	0	----	----	100	6		Paralysis	33	6
Milford	4	100	3	0	0	----	----	50	5	0	0	75	5	75	4	0	0	----	----	0	0		Chicken-pox	25	1
Northville *bb*	4	100	3	0	0	----	----	0	0	0	0	100	2	0	0	0	0	----	----	0	0		Urticaria	25	2
Pontiac—W. G. E.	4	100	2	0	0	----	----	100	4	0	0	100	1	0	0	0	0	----	----	0	0		The tonsilitis is reported as diphtheritic tonsilitis, April 13. The first case of membraneous croup I have seen for several y'rs, week ending April 27.		
Utica—G. G. R. *cc*	4	100	1	0	0	----	----	100	5	0	0	100	4	0	0	0	0	----	----	75	6				
Walled Lake	4	75	1	0	0	----	----	25	5	0	0	0	0	0	0	0	0	----	----	0	0				
Washington *dd*	3	67	3	0	0	67	4	0	0	0	0	100	2	0	0	0	0	----	----	0	0				
Wyandotte—E. P. C. *ee*	4	0	0	0	0	----	----	0	0	25	3	75	2	0	0	0	0	25	3	0	0				

* For names of observers, see Exhibit 31, pages 420-1.

† For counties in each division, see Exhibit 1, page 132. The numbers on this line are an average for the division.

‡, §, ‖, ¶. For these references, see foot-notes on page 449. For comments on the table, see pages 399, 403, 421.

a, b, c, etc. These letters refer across the page, from the names of observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

u During the last two weeks of March there were four or five mild cases of scarlatina in this vicinity, but as you will see by my accompanying report, there are none now. We have passed through a very long and very mild epidemic of this disease here. Probably there have occurred 50 or 75 cases with only three reported deaths.—*J. P. Stoddard, M. D., Albion*, April 8.

aa Fevers are beginning to take the lead; there are usually marked nervous symptoms with them, such as headache, delirium, etc.; not very sickly. —April 6. Nervous symptoms are very marked in fevers and some other ailments; I have seen cases with intense pain in the head and extending down the back, great intolerance of light and noise, thus resembling cerebro-spinal meningitis.—April 13. Very few cases of scarlatina reported; there is but little sickness; fevers are most common; nervous complications quite marked.—April 20. Nervous symptoms are still very prominent in diseases; diarrhea much less frequent; scarlatina only occasionally reported.—*W. H. Rouse, M. D., Detroit*, April 27.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Five Weeks ending* **June** *1, 1878.*

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.	
		Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	292	83	3.0	47	7.0	56	7.0	37	7.0	89	4.3	52	7.2	54	6.9	73	4.6	63	6.1	50	6.1	94	1.6	74	3.0	63	7.7	63	5.0
UPPER-PENIN. DIVISION†	*10*	*80*	*4*	*0*	*0*	*40*	*6*	*0*	*0*	*100*	*7*	*0*	*0*	*40*	*9*	*100*	*4*	*80*	*6*	*60*	*8*	*0*	*0*	*100*	*1*	*100*	*7*	*0*	*0*
Calumet	5	80	5	----	----	40	6	----	----	----	----	----	----	----	----	100	3	100	5	20	7	----	----	100	1	----	----	----	----
Houghton	5	80	3	0	0	0	0	0	0	100	7	0	0	40	9	100	4	60	6	100	9	0	0	0	0	100	7	0	0
NORTH-WESTERN DIV.†	*4*	*100*	*2*	*0*	*0*	*25*	*7*	*50*	*8*	*100*	*7*	*0*	*0*	*0*	*0*	*75*	*8*	*0*	*0*	*25*	*11*	*100*	*2*	*100*	*3*	*0*	*0*	*25*	*9*
Manistee	4	100	2	0	0	25	7	50	8	100	7	0	0	0	0	75	8	0	0	25	11	100	2	100	3	0	0	25	9
NORTH-EASTERN DIV.†	*5*	*80*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*60*	*3*	*60*	*3*	*0*	*0*	*60*	*3*	*0*	*0*	*0*	*0*	*0*	*0*
Alpena	5	80	3	0	0	0	0	0	0	0	0	0	0	0	0	60	3	60	3	0	0	60	3	0	0	0	0	0	0
WESTERN DIVISION†	*19*	*71*	*3*	*0*	*0*	*60*	*6*	*20*	*4*	*100*	*5*	*0*	*0*	*40*	*3*	*80*	*5*	*80*	*6*	*22*	*3*	*84*	*2*	*84*	*2*	*0*	*0*	*40*	*5*
Grand Haven	5	20	3	0	0	60	6	20	4	0	0	0	0	0	0	80	5	80	6	0	0	100	1	100	2	0	0	40	5
Grand Rapids	5	100	4	----	----	----	----	----	----	100	5	----	----	----	----	----	----	----	----	----	----	100	2	100	2	----	----	----	----
Holland	5	0	0	0	0	0	0	0	0	0	0	0	0	40	3	0	0	0	0	20	3	40	3	100	1	0	0	0	0
Ludington	4	100	2	0	0	0	0	0	0	----	----	0	0	0	0	0	0	0	0	25	3	100	1	25	4	0	0	----	----
CENTRAL DIVISION†	*53*	*76*	*3*	*40*	*5*	*100*	*9*	*25*	*10*	*95*	*4*	*0*	*0*	*100*	*6*	*67*	*5*	*20*	*3*	*20*	*3*	*89*	*2*	*79*	*3*	*60*	*3*	*92*	*4*
Charlotte	4	100	2	0	0	100	9	25	10	100	11	0	0	100	9	100	6	0	0	0	0	100	3	100	6	0	0	75	8
DeWitt	5	100	1	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	20	3	100	2	100	2	60	3	0	0
Elsie	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	0	0	0	0	100	2
Hastings	5	0	0	0	0	0	0	0	0	160	2	0	0	0	0	0	0	0	0	0	0	100	1	20	4	0	0	0	0
Howell	5	100	2	40	5	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	80	2	0	0	0	0	0	0
Hubbardston	5	----	----	----	----	----	----	----	----	60	4	----	----	----	----	----	----	----	----	----	----	100	1	----	----	----	----	----	----
Ionia	5	20	4	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
Lansing	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	75	1	----	----	----	----	100	2
North Lansing	5	20	5	0	0	0	0	0	0	100	3	0	0	0	0	40	4	0	0	0	0	100	1	60	4	0	0	0	0
Otisville	5	100	3	0	0	0	0	0	0	100	2	0	0	100	3	0	0	0	0	0	0	100	1	0	0	0	0	0	0
Ovid	5	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	3	0	0	20	2	100	1	0	0	0	0
NORTHERN-CENTRAL DIV.†	*4*	*50*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*25*	*2*	*25*	*6*	*25*	*5*	*50*	*2*	*0*	*0*	*50*	*2*	*100*	*1*	*25*	*3*	*0*	*0*	*0*	*0*
Big Rapids—*W. S. W.*	4	50	2	0	0	0	0	0	0	25	2	25	6	25	5	50	2	0	0	50	2	100	1	25	3	0	0	0	0
BAY AND EASTERN DIV.†	*45*	*97*	*2*	*40*	*7*	*0*	*0*	*27*	*6*	*100*	*5*	*67*	*6*	*40*	*7*	*80*	*4*	*40*	*6*	*48*	*5*	*96*	*1*	*83*	*4*	*80*	*7*	*56*	*5*
Bay City—W. H. B.	5	100	3	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	1	100	4	0	0	0	0
Bay City—W. R. M.	5	100	3	0	0	0	0	0	0	100	6	80	5	20	8	0	0	0	0	0	0	100	1	100	3	0	0	20	4
East Saginaw—N. H. C.	5	80	2	0	0	0	0	0	0	100	6	0	0	0	0	100	5	0	0	0	0	100	1	0	0	0	0	60	8
East Saginaw—*M. J. L.*	5	0	0	0	0	0	0	0	0	100	2	0	0	0	0	20	2	0	0	20	3	60	2	100	2	0	0	0	0
Lapeer—A. N.	5	0	0	0	0	0	0	0	0	100	8	0	0	0	0	100	4	20	4	60	7	100	1	100	6	0	0	100	5
Port Huron—*A. A. W.*	5	100	2	----	----	----	----	40	6	100	5	----	----	----	----	----	----	----	----	20	5	100	1	40	4	----	----	----	----
Saginaw City—N. D. L.	5	100	2	40	6	0	0	20	6	100	3	60	5	20	6	100	4	0	0	40	6	100	1	40	5	0	0	40	6
Saginaw City—*I. N. S.*	5	100	2	40	8	----	----	20	5	100	3	60	8	80	7	100	5	80	7	100	6	100	1	100	5	80	7	60	6
Thornville	5	100	3	0	0	0	0	0	0	100	6	0	0	0	0	60	3	20	6	0	0	100	1	0	0	0	0	0	0

SOUTH-WESTERN DIV.†	*39*	*72*	*3*	*40*	*6*	*0*	*0*	*0*	*0*	*87*	*3*	*20*	*4*	*50*	*3*	*33*	*5*	*20*	*3*	*20*	*5*	*100*	*2*	*55*	*3*	*0*	*0*	*0*	*0*
Allegan	5	100	4	40	6	0	0	0	0	100	3	0	0	0	0	0	0	0	0	20	6	100	1	40	2	0	0	0	0
Dowagiac—*C. W. M.*	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100	2	----	----	----		----	----
New Troy—L. H. D.	5	80	2	0	0	0	0	0	0	0	0	0	0	0	0	40	6	0	0	0	0	100	1	40	5	0	0	0	0
Niles—*O. P. H.*	5	20	4	0	0	0	0	0	0	100	3	20	4	0	0	0	0	0	0	20	3	100	1	0	0	0	0	0	0
Niles—J. S. R.	5	100	3	0	0	0	0	0	0	100	2	0	0	0	0	20	7	0	0	0	0	100	3	0	0	0	0	0	0
Otsego	5	0	0	0	0	0	0	0	0	60	3	0	0	0	0	0	0	0	0	0	0	100	5	0	0	0	0	0	0
Paw Paw	5	60	2	0	0	0	0	0	0	60	3	0	0	40	3	40	3	20	3	0	0	100	2	80	1	0	0	0	0
St. Joseph	5	0	0	0	0	0	0	0	0	100	2	0	0	60	3	0	0	0	0	0	0	100	2	60	3	0	0	0	0
SOUTHERN-CENTRAL DIV.†	*65*	*88*	*3*	*100*	*4*	*0*	*0*	*60*	*9*	*77*	*4*	*0*	*0*	*20*	*9*	*65*	*5*	*60*	*5*	*60*	*7*	*97*	*1*	*69*	*3*	*20*	*5*	*0*	*0*
Adrian	5	100	2	100	4	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
Albion	5	100	4	0	0	0	0	100	8	100	3	0	0	20	10	100	7	100	7	100	5	100	2	100	2	0	0	0	0
Brooklyn	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	3	0	0	0	0	100	1	80	2	0	0	0	0
Coldwater	5	80	4	0	0	0	0	0	0	40	5	0	0	0	0	0	0	0	0	0	0	100	1	20	2	0	0	0	0
Jackson—W. W.	5	100	3	0	0	0	0	0	0	100	4	0	0	20	7	0	0	0	0	0	0	100	2	100	3	0	0	0	0
Jackson (State Prison)	5	100	2	----	----	----	----	----	----	100	5	----	----	----	----	----	----	----	----	----	----	80	2	20	1	----	----	----	----
Kalamazoo	5	20	4	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
Marshall	5	100	1	0	0	0	0	0	0	20	6	0	0	0	0	0	0	0	0	0	0	80	3	0	0	0	0	0	0
Mendon—H. C. C.	5	100	3	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100		100	2	20	5	0	0
Mendon—E. S.	5	80	2	0	0	0	0	0	0	40	4	0	0	0	0	40	2	20	3	0	0	100	1	40	2	0	0	0	0
Sturgis	5	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	1	60	2	0	0	0	0
Three Rivers	5	100	3	0	0	0	0	20	9	100	9	0	0	20	9	100	7	0	0	20	9	100	1	100	8	0	0	0	0
Ypsilanti	5	0	0	0	0	0	0	0	0	20	3	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
SOUTH-EASTERN DIV.†	*48*	*81*	*4*	*20*	*13*	*0*	*0*	*0*	*0*	*93*	*5*	*60*	*15*	*93*	*10*	*89*	*5*	*100*	*11*	*75*	*8*	*96*	*2*	*70*	*3*	*60*	*12*	*65*	*5*
Detroit—L. C.	5	100	4	0	0	0	0	0	0	100	3	0	0	0	0	100	11	100	13	100	13	100	3	100	7	0	0	100	8
Detroit—*E. L.*	5	100	7	20	13	0	0	0	0	100	8	60	15	100	14	100	4	100	9	100	13	100	2	100	1	20	13	100	8
Detroit—W. H. R.	5	100	4	0	0	0	0	0	0	100	7	0	0	100	12	100	8	100	11	100	9	100		100	2	100	11	0	0
Milford	5	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100		0	0	0	0	0	0
Northville	5	20	2	0	0	0	0	0	0	40	4	0	0	0	0	0	0	0	0	0	0	100		0	0	0	0	20	2
Pontiac—W. G. E.	3	100	3	0	0	0	0	0	0	100	6	0	0	0	0	100	4	0	0	67	5	100		0	0	0	0	0	0
Utica—G. G. R.	5	100	5	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	80	3	40	4	0	0	0	0
Walled Lake	5	20	3	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	1	60	2	0	0	0	0
Washington	5	100	2	0	0	0	0	0	0	100	2	0	0	80	3	60	3	0	0	60	3	80	2	0	0	0	0	0	0
Wyandotte—E. P. C.	5	80	2	0	0	0	0	0	0	100	3	0	0	0	0	80	2	0	0	20	3	100	1	20	2	0	0	40	2

* For names of observers, see Exhibit 31, pages 320-1; for comments on the table, see pages 399, 403, 421.

† For counties in each division see Exhibit 1, page 153. The numbers on this line are an average for the division.

‡, §, ‖. For these references, see foot-notes on page 449. A statement of the plan of marking the card-reports is given on pages 397-8.

ADDITIONAL NOTES FOR MARCH.—*w* Continues healthy, 4 weeks ending March 30. We isolated two cases of diphtheria which occurred last week, taking all the sanitary precautions we could, March 25.—*C. W. Backus, M. D., Three Rivers.*

x Not much illness, March 9. No severe illness, March 30. Diphtheria, though not of a malignant form, is prevalent; but it requires prompt treatment or otherwise a fatal result is certain. It is influenced by the weather, and atmospheric change is sure to increase it. Malarious influence is very evident. High fever and a temperature of 104° to 106° are the first symptoms complained of, and no reference to throat till 24 hours have elapsed,—March 16.—*E. Bidwell, M. D., Ypsilanti.*

z Bowel diseases take the lead; it is probably of malarial origin, though we should expect the opposite conditions. There has been some increase of sickness, but the city is healthy, March 9. Quite a number of cases of diarrhea somewhat simulating dysentery; malarial fevers somewhat prevalent; whooping-cough subsiding, March 13. There seems to be considerable cerebral trouble associated with other diseases; the health of the city is good,—March 23. There are many cases, relatively, of severe headache with various diseases, and more than the average number of cases of cerebral troubles,—March 30.—*W. H. Rouse, M. D., Detroit.*

TABLE 3.—*Diseases, by Localities in Michigan, Five Weeks ending* **June** *1, 1878*—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Influenza. Per ct. of Weeks Present.‡	Influenza. Av. Ord. of Prev. when Present.§	Measles. Per ct. of Weeks Present.‡	Measles. Av. Ord. of Prev. when Present.§	Neuralgia.¶ Per ct. of Weeks Present.‡	Neuralgia.¶ Av. Ord. of Prev. when Present.§	Pneumonia. Per ct. of Weeks Present.‡	Pneumonia. Av. Ord. of Prev. when Present.§	Puerperal Fever. Per ct. of Weeks Present.‡	Puerperal Fever. Av. Ord. of Prev. when Present.§	Rheumatism. Per ct. of Weeks Present.‡	Rheumatism. Av. Ord. of Prev. when Present.§	Scarlatina. Per ct. of Weeks Present.‡	Scarlatina. Av. Ord. of Prev. when Present.§	Small-pox. Per ct. of Weeks Present.‡	Small-pox. Av. Ord. of Prev. when Present.§	Tonsilitis.¶ Per ct. of Weeks Present.‡	Tonsilitis.¶ Av. Ord. of Prev. when Present.§	Whooping-cough. Per ct. of Weeks Present.‡	Whooping-cough. Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	292	75	2.9	54	4.2	65	4.0	65	4.7	35	6.0	84	3.6	61	5.4	0	0	50	3.0	65	4.9
UPPER-PENINSULAR DIV.†	*10*	*60*	*5*	*60*	*4*	----	----	*80*	*6*	*0*	*0*	*100*	*4*	*100*	*3*	*0*	*0*	----	----	*0*	*0*
Calumet	5	20	4	60	4	----	----	60	5	----	----	100	4	100	2	----	----	----	----	----	----
Houghton *a*	5	100	5	0	0	----	----	100	7	0	0	0	0	100	3	0	0	----	----	0	0
NORTH-WESTERN DIV.†	*4*	*100*	*3*	*0*	*0*	----	----	*100*	*5*	*0*	*0*	*100*	*6*	*0*	*0*	*0*	*0*	----	----	*50*	*10*
Manistee	4	100	3	0	0	----	----	100	5	0	0	100	6	0	0	0	0	----	----	50	10
NORTH-EASTERN DIV.†	*5*	*100*	*1*	*60*	*2*	----	----	*0*	*0*	*0*	*0*	*0*	*0*	*40*	*4*	*0*	*0*	----	----	*0*	*0*
Alpena	5	100	1	60	2	----	----	0	0	0	0	0	0	40	4	0	0	----	----	0	0
WESTERN DIVISION†	*19*	*80*	*3*	*0*	*0*	----	----	*80*	*4*	*0*	*0*	*42*	*4*	*53*	*5*	*0*	*0*	----	----	*0*	*0*
Grand Haven	5	0	0	0	0	----	----	100	5	0	0	60	5	40	8	0	0	----	----	0	0
Grand Rapids	5	100	3	----	----	----	----	----	----	----	----	60	6	20	6	----	----	----	----	----	----
Holland *b*	5	60	2	0	0	----	----	60	3	0	0	20	3	100	2	0	0	----	----	0	0
Ludington *c*	4	0	0	0	0	----	----	0	0	0	0	25	3	0	0	0	0	----	----	0	0
CENTRAL DIVISION†	*53*	*54*	*3*	*20*	*3*	----	----	*46*	*4*	*38*	*7*	*79*	*4*	*40*	*2*	*0*	*0*	*20*	*1*	*47*	*3*
Charlotte	4	100	1	0	0	----	----	100	6	25	12	100	5	0	0	0	0	----	----	0	0
DeWitt *d*	5	0	0	0	0	----	----	40	2	0	0	80	2	0	0	0	0	----	----	0	0
Elsie	5	0	0	0	0	----	----	60	2	0	0	0	0	40	1	0	0	20	1	0	0
Hastings	5	40	3	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	60	3
Howell	5	0	0	0	0	----	----	20	5	0	0	100	4	0	0	0	0	----	----	0	0
Hubbardston	5	100	2	----	----	----	----	60	3	----	----	60	3	----	----	----	----	----	----	----	----
Ionia	5	20	4	0	0	----	----	0	0	0	0	0	0	20	4	0	0	----	----	0	0
Lansing	4	----	----	----	----	----	----	----	----	50	2	----	----	----	----	----	----	----	----	----	----
North Lansing *e*	5	0	0	0	0	----	----	60	4	0	0	100	4	0	0	0	0	----	----	0	0
Otisville	5	0	0	0	0	----	----	20	5	0	0	40	4	0	0	0	0	----	----	60	3
Ovid	5	20	3	20	3	----	----	20	3	0	0	0	0	60	2	0	0	----	----	20	4
NORTH'N-CENTRAL DIV.†	*4*	*25*	*1*	*25*	*2*	----	----	*0*	*0*	*0*	*0*	*75*	*3*	*0*	*0*	*0*	*0*	----	----	*0*	*0*
Big Rapids—*W. & W.* *f*	4	25	1	25	2	----	----	0	0	0	0	75	3	0	0	0	0	----	----	0	0
BAY AND EASTERN DIV.†	*45*	*71*	*3*	*0*	*0*	----	----	*78*	*5*	*0*	*0*	*100*	*4*	*56*	*5*	*0*	*0*	----	----	*40*	*5*
Bay City—W. H. B.	5	100	5	0	0	----	----	80	7	0	0	100	3	60	5	0	0	----	----	0	0
Bay City—W. R. M. *g*	5	100	3	0	0	----	----	100	5	0	0	100	4	40	6	0	0	----	----	0	0
East Saginaw—N. H. C.	5	0	0	0	0	----	----	80	4	0	0	0	0	80	4	0	0	----	----	0	0
East Saginaw—*M. J. L.*	5	20	2	0	0	----	----	40	3	0	0	100	2	80	3	0	0	----	----	0	0
Lapeer—A. N.	5	100	2	0	0	----	----	100	5	0	0	100	7	0	0	0	0	----	----	0	0
Port Huron—*A. A. W.*	5	60	4	----	----	----	----	40	5	----	----	100	3	----	----	----	----	----	----	----	----
Saginaw City—N. D. L. *h*	5	0	0	0	0	----	----	100	5	0	0	100	3	0	0	0	0	----	----	0	0
Saginaw City—*I. N. S.* *i*	5	80	6	----	----	----	----	80	6	----	----	100	3	40	8	----	----	----	----	----	----
Thornville	5	40	1	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	40	5
SOUTH-WESTERN DIV.†	*39*	*74*	*3*	*0*	*0*	*60*	*4*	*67*	*3*	*0*	*0*	*94*	*3*	*60*	*4*	*0*	*0*	*25*	*3*	*53*	*3*
Allegan	5	0	0	0	0	----	----	0	0	0	0	100	3	0	0	0	0	----	----	0	0
Dowagiac—*C. W. M.* *j*	4	50	3	----	----	----	----	25	3	----	----	----	----	----	----	----	----	25	3	----	----

	DISEASES REPORTED WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
a	Diphtheritic sore throat	100	3
b	Bilious fever	40	3
c	See note *c* for May, below.		
d	Abortion	60	3
	Anæmia	60	3
	Asthma and hysteria, each	40	3
	Eczema	20	1
	Goitre, gonorrhea, and metrorrhagia, each	20	3
	Leucorrhea	20	1
	Scrofula	20	4
e	Meningitis	20	5
	Mumps	100	2
	Many more cases of mumps, May 11.		
f	Spasmodic croup	25	2
	A general time of good health with us, May 20.		
g	See note *g* for May, below.		
h	Very little sickness, May 4.		
i	Last week there were 26 cases of intermittent fever reported, May 18.		
j	Mumps	100	2
k	Infantile convulsions	20	5
	Mumps	20	3
	Urticaria	20	5
	The neuralgia was of malarial origin. A sudden change in the weather causing increase of bronchitis, w'k ending May 25.		
l	Acute softening of brain	25	3
	Little sickness, May 25.		
m	Catarrh	20	3
	Dyspepsia	40	2
	Gastralgia	20	3
	Hemiplegia	40	3
	Ophthalmia	20	3
	Spermatorrhea	20	3
	Spinal irritation	20	3

New Troy—L. H. D. *k*	5	0	0	0	0	80	4	0	0	0	0	100	5	60	4	0	0	----	----	40	7		Strangury	20	3
Niles—*O. P. H.*	5	100	2	0	0	----	----	100	2	0	0	100	3	0	0	0	0	----	----	0	0		Vaginitis	60	3
Niles—J. S. R.	5	80	5	0	0	----	----	80	6	0	0	100	3	0	0	0	0	----	----	0	0	*n*	Abscess and herpes zoster, each, 1 case, 2 weeks ending May 25.		
Otsego *l*	5	0	0	0	0	----	----	20	3	0	0	100	2	0	0	0	0	----	----	20	2				
Paw Paw *m*	5	60	2	0	0	40	3	100	1	0	0	80	3	0	0	0	0	----	----	0	0				
St. Joseph *n*	5	0	0	0	0	----	----	0	0	0	0	80	3	0	0	0	0	----	----	100	1	*o*	Very little sickness, May 4. No great amount of sickness, May 18. Genuineness of diphtheria questioned, May 25.		
SOUTH'N-CENTRAL DIV.†	*65*	*73*	*3*	*0*	*0*	*70*	*5*	*47*	*5*	*20*	*4*	*80*	*4*	*80*	*9*	*0*	*0*	*100*	*5*	*80*	*2*				
Adrian	5	0	0	0	0	----	----	0	0	0	0	80	3	0	0	0	0	----	----	0	0				
Albion *o*	5	100	2	0	0	----	----	100	4	0	0	100	4	80	9	----	----	----	----	----	----				
Brooklyn	5	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0				
Coldwater	5	0	0	0	0	----	----	20	3	0	0	100	2	----	----	----	----	----	----	----	----	*p*	General systemic disturbances	20	1
Jackson—W. W. *p*	5	100	2	0	0	----	----	0	0	0	0	60	5	0	0	0	0	----	----	0	0	*q*	Syphilis	100	4
Jackson (State Prison) *q*	5	----	----	----	----	----	----	----	----	----	----	100	2	----	----	----	----	100	5	----	----	*r*	Hepatitis	20	5
Kalamazoo	5	20	2	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	80	2		Diabetes mel.	20	3
Marshall	5	40	4	0	0	----	----	80	3	0	0	80	3	0	0	0	0	----	----	0	0	*s*	Dyspepsia	40	4
Mendon—H. C. C. *r*	5	0	0	0	0	----	----	40	5	20	4	100	4	0	0	0	0	----	----	0	0		Pharyngitis	40	4
Mendon—E. S. *s*	5	80	2	0	0	40	4	0	0	0	0	40	4	0	0	0	0	----	----	0	0	*t*	Catarrh	60	6
Sturgis	5	0	0	0	0	----	----	20	5	0	0	0	0	0	0	0	0	----	----	60	3		Dyspepsia	80	8
Three Rivers *t*	5	100	5	0	0	100	5	20	9	0	0	100	6	0	0	0	0	----	----	0	0		Pharyngitis	100	8
Ypsilanti *u*	5	0	0	0	0	----	----	0	0	0	0	40	2	0	0	0	0	----	----	100	2		Continues healthy, five weeks ending June 1.		
SOUTH-EASTERN DIV.†	*48*	*97*	*3*	*100*	*10*	----	----	*72*	*6*	*40*	*6*	*83*	*4*	*70*	*9*	*0*	*0*	----	----	*80*	*7*	*u*	Asthma	20	3
Detroit—L. C.	5	100	5	100	10	----	----	100	11	0	0	100	4	100	7	0	0	----	----	100	7		Very little sickness, June 1.		
Detroit—*E. L.* *v*	5	100	3	0	0	----	----	100	10	0	0	100	7	100	12	0	0	----	----	100	7	*v*	Mumps	20	15
Detroit—W. H. R. *w*	5	100	4	0	0	----	----	100	6	0	0	100	4	40	14	0	0	----	----	80	12	*w*	See note *w* for May, below.		
Milford	5	100	2	0	0	----	----	60	5	0	0	80	4	0	0	0	0	----	----	0	0	*x*	Very little sickness, two weeks ending May 11. Catarrh, colds, etc., most abundant, May 25. No sickness except general bilious troubles, May 21.	25	1
Northville *x*	5	100	1	0	0	----	----	20	3	0	0	40	3	0	0	0	0	----	----	0	0				
Pontiac—W. G. E.	3	100	4	0	0	----	----	67	5	0	0	100	2	0	0	0	0	----	----	0	0				
Utica—G. G. R. *y*	5	100	1	0	0	----	----	100	6	40	8	100	5	0	0	0	0	----	----	60	7	*y*	Dyspepsia	100	2
Walled Lake	5	80	2	0	0	----	----	20	5	0	0	60	3	----	----	----	----	----	----	----	----	*z*	Cancer	20	4
Washington *z*	5	0	0	0	0	----	----	0	0	40	4	100		0	0	0	0	----	----	60	3		Cystitis	40	3
Wyandotte—E. P. C.	5	0	0	0	0	----	----	80	3	0	0	60	2	40	3	0	0	----	----	0	0		Dropsy	100	3
																							General debility	100	2
																							Apoplexy, rheumatic gout, and urinary disease, each.	20	3
																							Good health, May 25.		

* For names of observers, see Exhibit 31, pages 320-1.

† For counties in each division, see Exhibit 1, page 153. The numbers on this line are an average for the division.

‡, §, ‖, ¶. For these references, see foot-notes on page 449; for comments on the table, see pages 399, 403, 421.

a, *b*, *c*, etc. These letters refer across the page, from the names of observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

c It has been very healthy so far this spring; sickness is now, perhaps, a little on the increase,—May 11. Very little sickness, May 18 and June 1.—*A. P. McConnell, M. D., Ludington.*

g Very little sickness, May 18 and June 1. Very little change, 4 weeks ending May 4, 11, 25, and June 1.—*W. R. Marsh, M. D., Bay City.*

w Very little sickness, 5 weeks ending June 1. Some increase of rheumatism, May 4. Diphtheria, scarlatina, and whooping-cough are reported occasionally; I have seen none lately, May 11. Malarial ailments take the lead, May 11 and May 25.—*W. H. Rouse, M. D., Detroit.*

NOTE.—May 13, 1878, Dr. Wm. P. Maiden, of Alpena, wrote: "Saturday morning, May 4, Scarlatina broke out on youngest child of keeper of poor-house,—doing well. Saturday morning, May 11, another case in city, next door to postoffice. I fear we are in for a time with it. I am using all possible precautions against its spreading." It will be noticed that no other cases of scarlet fever were reported from Alpena for the year 1878.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **June** *29, 1878.*

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.	
		Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	235	85	3.1	33	3.3	48	7.3	47	6.2	95	4.9	33	6.3	51	5.4	69	4.4	70	6.5	75	7.3	97	1.5	77	2.7	50	6.6	61	5.2
UPPER-PEN N. D VISION†	*6*	*100*	*4*	*0*	*0*	*67*	*6*	*83*	*6*	*100*	*7*	*0*	*0*	*0*	*0*	*100*	*4*	*83*	*5*	*83*	*8*	*0*	*0*	*100*	*3*	*0*	*0*	*0*	*0*
Calumet	3	100	5	----	----	100	6	67	6	----	----	----	----	----	----	100	3	100	5	67	6	----	----	100	3	----	----	----	----
Houghton	3	100	2	0	0	33	6	100	5	100	7	0	0	0	0	100	5	67	4	100	10	0	0	0	0	0	0	0	0
NORTH-WESTERN DIV.†	*3*	*67*	*5*	*0*	*0*	*33*	*10*	*67*	*7*	*100*	*7*	*0*	*0*	*0*	*0*	*100*	*3*	*0*	*0*	*0*	*0*	*100*	*1*	*100*	*2*	*0*	*0*	*0*	*0*
Manistee	3	67	5	0	0	33	10	67	7	100	7	0	0	0	0	100	3	0	0	0	0	100	1	100	2	0	0	0	0
NORTH-EASTERN DIV.†	*4*	*100*	*4*	*0*	*0*	*25*	*6*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*50*	*6*	*50*	*5*	*0*	*0*	*75*	*5*	*25*	*4*	*0*	*0*	*0*	*0*
Alpena	4	100	4	0	0	25	6	0	0	0	0	0	0	0	0	50	6	50	5	0	0	75	5	25	4	0	0	0	0
WESTERN DIVISION†	*16*	*63*	*3*	*0*	*0*	*75*	*5*	*25*	*6*	*100*	*5*	*25*	*3*	*75*	*5*	*100*	*4*	*63*	*5*	*50*	*3*	*100*	*2*	*100*	*1*	*0*	*0*	*0*	*0*
Grand Haven	4	0	0	0	0	75	5	25	5	0	0	0	0	0	0	100	4	100	5	----	----	100	1	100	2	0	0	0	0
Grand Rapids	4	25	4	0	0	0	0	0	0	100	5	0	0	75	5	0	0	25	5	0	0	100	2	100	1	0	0	0	0
Holland	4	0	0	0	0	0	0	0	0	0	0	25	3	0	0	0	0	0	0	50	3	100	3	100	1	0	0	0	0
Ludington	4	100	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100	1	----	----	----	----	----	----
CENTRAL DIVISION†	*30*	*65*	*3*	*0*	*0*	*100*	*8*	*100*	*10*	*97*	*4*	*0*	*0*	*47*	*5*	*40*	*3*	*0*	*0*	*75*	*4*	*97*	*1*	*67*	*3*	*38*	*3*	*71*	*6*
Charlotte	3	100	3	0	0	100	8	100	10	100	11	0	0	33	10	100	3	0	0	0	0	100	2	100	5	0	0	100	10
DeWitt	4	25	2	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	2	75	1	50	3	0	0
Elsie	4	0	0	0	0	0	0	0	0	0	0	0	0	50	3	25	3	0	0	0	0	75	2	25	4	0	0	0	0
Hastings	4	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	100	1	50	3	0	0	0	0
Howell	4	100	2	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
Hubbardston	4	----	----	----	----	----	----	----	----	75	5	----	----	----	----	25	4	----	----	----	----	100	1	75	3	----	----	----	----
Ionia	4	0	0	0	0	0	0	0	0	100	3	0	0	25	5	0	0	0	0	0	0	100	1	0	0	0	0	0	0
North Lansing	4	50	3	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	75	4	100	1	50	3	0	0	0	0
Otisville	4	50	4	0	0	0	0	0	0	100	2	0	0	75	3	25	3	0	0	0	0	100	2	0	0	0	0	0	0
Ovid	4	75	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	25	2	50	1
NORTHERN-CENTRAL DIV.†	*4*	*25*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*1*	*0*	*0*	*25*	*2*	*0*	*0*
Big Rap.—*W.& W.& I. W.B.*	4	25	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0	25	2	0	0
BAY AND EASTERN DIV.†	*37*	*100*	*4*	*0*	*0*	*38*	*7*	*35*	*7*	*94*	*6*	*42*	*6*	*26*	*8*	*79*	*4*	*58*	*6*	*80*	*6*	*100*	*1*	*81*	*4*	*0*	*0*	*70*	*6*
Bay City—W. H. B.	4	100	3	----	----	50	7	25	7	100	7	0	0	0	0	100	5	25	9	0	0	100	1	100	5	0	0	0	0
Bay City—W. R. M.	4	100	4	0	0	0	0	0	0	100	5	50	5	0	0	50	5	0	0	0	0	100	1	75	2	0	0	0	0
East Saginaw—*M. J. L.*	3	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0	33	3	33	3	100	1	100	2	0	0	0	0
Lapeer—A. N.	4	0	0	0	0	0	0	50	9	100	9	0	0	25	8	100	3	75	7	100	6	100	1	75	6	0	0	100	5
Port Huron—*S. W. S.*	4	100	7	0	0	0	0	50	8	100	9	25	8	0	0	100	4	50	6	100	9	100	1	100	2	0	0	100	8
Port Huron—A. A. W.	4	100	2	----	----	----	----	25	5	50	5	50	5	----	----	----	----	----	----	----	----	100	2	50	1	----	----	25	4
Port Sanilac	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Saginaw City—N. D. L.	4	100	3	0	0	0	0	0	0	100	3	0	0	0	0	50	4	0	0	0	0	100	1	50	5	0	0	50	5
Saginaw City—*I. N. S.*	4	100	3	0	0	25	7	25	7	100	4	0	0	25	7	100	4	100	6	75	7	100	1	100	6	0	0	75	6
Thornville	4	100	3	0	0	0	0	0	0	100	6	0	0	0	0	50	4	0	0	0	0	100	2	0	0	0	0	0	0

SOUTH-WESTERN DIV.†	*34*	*73*	*3*	*25*	*3*	*0*	*0*	*25*	*3*	*96*	*4*	*0*	*0*	*42*	*3*	*25*	*6*	*50*	*3*	*86*	*5*	*91*	*2*	*61*	*2*	*0*	*0*	*38*	*4*
Allegan	4	0	0	0	0	0	0	0	0	100	4	0	0	50	4	25	4	0	0	0	0	100	1	100	2	0	0	0	0
Dowagiac—*C. W. M.*	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	75	1	25	1	----	----	----	----
Mattawan	3	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	33	3	33	3	0	0	0	0
New Troy—L. H. D.	3	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	6	100	1	0	0	0	0	0	0
Niles—*O. P. H.*	4	0	0	25	3	0	0	25	3	100	4	0	0	0	0	0	0	0	0	100	3	100		0	0	0	0	50	3
Niles—J. S. R.	4	100	4	----	----	0	0	0	0	100	5	----	----	0	0	25	7	0	0	0	0	100	1	25	3	0	0	25	4
Otsego	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	3	0	0	100	1	0	0	0	0	0	0
Paw Paw	4	50	3	0	0	0	0	0	0	75	3	0	0	50	3	0	0	0	0	0	0	100	2	75		0	0	0	0
St. Joseph	4	50		0	0	0	0	25	2	100	3	0	0	25	2	0	0	0	0	0	0	100	3	100	2	0	0	0	0
SOUTHERN-CENTRAL DIV.†	*52*	*91*	*2*	*38*	*4*	*25*	*7*	*44*	*6*	*94*	*4*	*25*	*2*	*100*	*2*	*63*	*5*	*100*	*8*	*50*	*7*	*98*	*1*	*86*	*3*	*0*	*0*	*25*	*4*
Adrian	4	50	2	50	3	0	0	0	0	50	2	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
Albion	4	100	4	0	0	25	7	75	8	100	4	0	0	0	0	100	8	100	8	100	7	100	2	100	4	0	0	0	0
Brooklyn	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
Coldwater	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
Jackson—W. W.	4	100	2	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	2	100	1	0	0	0	0
Jackson (State Prison)	4	100	2	----	----	----	----	----	----	100	4	----	----	----	----	----	----	----	----	----	----	100	3	----	----	----	----	----	----
Kalamazoo	4	0	0	0	0	0	0	0	0	100	3	0	0	100	2	25	3	0	0	0	0	100	2	0	0	0	0	0	0
Marshall	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0
Mendon—H. C. C.	4	100	2	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	25	6
Mendon—E. S.	4	75	3	0	0	0	0	50	3	100	3	0	0	0	0	25	4	0	0	0	0	75		100	3	0	0	0	0
Sturgis	4	0	0	0	0	0	0	25	5	100	3	0	0	0	0	0	0	0	0	25	4	100		75	2	0	0	0	0
Three Rivers	4	100	2	0	0	0	0	25	9	100	9	0	0	0	0	100	6	0	0	25	9	100		75	6	0	0	0	0
Ypsilanti	4	0	0	25	4	0	0	0	0	0	0	25	2	0	0	0	0	0	0	0	0	100		25	2	0	0	25	2
SOUTH-EASTERN DIV.†	*40*	*97*	*4*	*0*	*0*	*38*	*9*	*63*	*7*	*94*	*6*	*25*	*15*	*58*	*8*	*79*	*5*	*88*	*10*	*92*	*13*	*100*	*2*	*79*	*3*	*63*	*10*	*75*	*6*
Detroit—L. C.	4	100	3	0	0	25	12	50	8	100	8	0	0	0	0	100	5	100	12	100	14	100	2	100	5	25	13	100	11
Detroit—*E. L.*	4	100	6	0	0	0	0	0	0	100	9	25	15	100	15	100	9	100	12	100	14	100	2	100	1	100	11	100	9
Detroit—W. H. R.	4	100	4	0	0	0	0	0	0	100	7	0	0	0	0	100	8	100	9	75	11	100		100	2	100	10	0	0
Milford	4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100		0	0	0	0	0	0
Northville	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100		50	2	0	0	75	3
Pontiac—W. G. E.	4	100	4	0	0	50	6	75	5	100	6	0	0	0	0	100	2	0	0	0	0	100		0	0	0	0	0	0
Utica—G. G. R.	4	75	5	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	0	0	100	3	100	4	25	5	0	0
Walled Lake	4	0	0	0	0	0	0	0	0	100	4	0	0	0	0	25	2	0	0	0	0	100	1	75	2	0	0	0	0
Washington	4	100	1	0	0	0	0	0	0	100	3	0	0	25	5	75	5	50	5	0	0	100	2	0	0	0	0	0	0
Wyandotte—E. P. C.	4	100	2	----	----	----	----	----	----	50	3	----	----	50	3	50	2	----	----	----	----	100	1	25	2	----	----	25	1

* For names of observers, see Exhibit 31, pages 420-1; for comments on the table, see pages 399, 403, 421.
† For counties in each division see Exhibit 1, page 153. The numbers on this line are an average for the division.
‡, §, ||. For explanations of the methods of compiling this table see foot-notes on page 449.

ADDITIONAL NOTES FOR MARCH.—*dd* From my weekly reports you must have noticed that I have placed the various forms of dyspepsia very high in the scale. The older Physicians tell me that they never knew it to be so prevalent. Most of our cases are among farmers, and others who gain their living by out-of-door work. Almost without an exception the complaint is excessive flatulence; food as soon as eaten undergoes a fermentative process which gives rise to great quantities of gas. Our idea as to the cause is as follows: A mild winter, so that little work in the woods could be done. The same amount of salt meats have been consumed by those living comparatively idle. In a few instances the excessive use of tea and coffee. If it be not asking too much, it would oblige me if you would answer the following: Has an unusual amount of dyspepsia been present throughout the State? and if so, what has been the cause?—*G. G. R., March 22, 1878.*

TABLE 3.—*Diseases, by Localities in Michigan, Four Weeks ending* **June** *29, 1878*—CONTINUED.

ISIONS AND LITIES REPRESENTED.* (there were, during the wo or more observers place, their initials are -Health Officers in italse also Correspondents ed with a *.)	Reports Received.	Influenza. Per ct. of Weeks Present.‡	Influenza. Av. Ord. of Prev. when Present.§	Measles. Per ct. of Weeks Present.‡	Measles. Av. Ord. of Prev. when Present.§	Neuralgia.¶ Per ct. of Weeks Present.‡	Neuralgia.¶ Av. Ord. of Prev. when Present.§	Pneumonia. Per ct. of Weeks Present.‡	Pneumonia. Av. Ord. of Prev. when Present.§	Puerperal Fever. Per ct. of Weeks Present.‡	Puerperal Fever. Av. Ord. of Prev. when Present.§	Rheumatism. Per ct. of Weeks Present.‡	Rheumatism. Av. Ord. of Prev. when Present.§	Scarlatina. Per ct. of Weeks Present.‡	Scarlatina. Av. Ord. of Prev. when Present.§	Smallpox. Per ct. of Weeks Present.‡	Smallpox. Av. Ord. of Prev. when Present.§	Tonsilitis.¶ Per ct. of Weeks Present.‡	Tonsilitis.¶ Av. Ord. of Prev. when Present.§	Whooping-cough. Per ct. of Weeks Present.‡	Whooping-cough. Av. Ord. of Prev. when Present.§
LOCALITIES ‖	235	78	3.2	80	5.5	67	4.0	60	5.0	55	5.7	79	4.1	71	4.5	50	5.0	63	5.0	65	4.7
UPPER-PENINSULAR DIV.†	*6*	*100*	*2*	*100*	*4*	*0*	*0*	*100*	*9*	*67*	*7*	*100*	*8*	*100*	*6*	*0*	*0*	----	----	*0*	*0*
Calumet	3	----	----	100	4	----	----	----	----	67	7	100	6	100	1	----	----	----	----	----	----
Houghton ..... *a*	3	100	2	0	0	----	----	100	9	0	0	100	9	100	5	0	0	----	----	0	0
NORTH-WESTERN DIV.†	*3*	*67*	*5*	*0*	*0*	----	----	*67*	*6*	*0*	*0*	*100*	*7*	*0*	*0*	*0*	*0*	----	----	*0*	*0*
Manistee	3	67	5	0	0	----	----	67	6	0	0	100	7	0	0	0	0	----	----	0	0
NORTH-EASTERN DIV.†	*4*	*100*	*2*	*100*	*2*	----	----	*0*	*0*	*0*	*0*	*75*	*5*	*0*	*0*	*0*	*0*	----	----	*100*	*2*
Alpena ..... *b*	4	100	2	100	2	----	----	0	6	0	0	75	5	0	0	0	0	----	----	100	2
WESTERN DIVISION.†	*16*	*63*	*3*	*0*	*0*	----	----	*33*	*3*	*0*	*0*	*75*	*5*	*25*	*5*	*0*	*0*	----	----	*0*	*0*
Grand Haven	4	0	0	0	0	----	----	25	4	0	0	100	5	0	0	0	0	----	----	0	0
Grand Rapids	4	100	3	0	0	----	----	0	0	0	0	100	6	25	6	0	0	----	----	0	0
Holland ..... *c*	4	25	2	0	0	----	----	50	3	0	0	25	3	25	3	0	0	----	----	0	0
Ludington ..... *d*	4	----	----	----	----	----	----	25	3	----	----	----	----	----	----	----	----	----	----	----	----
CENTRAL DIVISION.†	*39*	*86*	*3*	*25*	*4*	*50*	*2*	*53*	*5*	*0*	*0*	*74*	*4*	*81*	*4*	*50*	*5*	*25*	*4*	*58*	*3*
Charlotte	3	100	3	0	0	----	----	100	7	0	0	100	5	0	0	0	0	----	----	0	0
DeWitt ..... *e*	4	0	0	0	0	50	2	75	3	0	0	75	3	0	0	0	0	----	----	0	0
Elsie ..... *f*	4	0	0	0	0	----	----	25	3	0	0	0	0	100	1	0	0	25	4	0	0
Hastings	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Howell	4	0	0	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0
Hubbardston ..... *g*	4	75	2	----	----	----	----	25	7	----	----	100	4	----	----	----	----	----	----	----	----
Ionia	4	0	0	0	0	----	----	0	0	0	0	0	0	75	4	0	0	----	----	0	0
North Lansing ..... *h*	4	0	0	0	0	----	----	50	3	0	0	100	3	0	0	50	5	----	----	25	2
Otisville	4	0	0	0	0	----	----	0	0	0	0	25	4	50	5	0	0	----	----	100	1
Ovid	4	0	0	25	4	----	----	0	0	0	0	25	4	100	4	0	0	----	----	50	5
NORTH'N-CENTRAL DIV.†	*4*	*0*	*0*	*0*	*0*	----	----	*0*	*0*	*0*	*0*	*50*	*2*	*0*	*0*	*0*	*0*	----	----	*0*	*0*
Big Rap., *W.S.W.&I.W.B.i*	4	0	0	0	0	----	----	0	0	0	0	50	2	0	0	0	0	----	----	0	0
BAY AND EASTERN DIV.†	*37*	*77*	*4*	*0*	*0*	----	----	*70*	*5*	*25*	*6*	*94*	*5*	*73*	*5*	*0*	*0*	----	----	*63*	*5*
Bay City—W. H. B.	4	75	4	0	0	----	----	0	0	0	0	100	5	100	5	0	0	----	----	0	0
Bay City—W. R. M. ..... *j*	4	100	3	0	0	----	----	100	5	0	0	100	4	75	4	0	0	----	----	0	0
East Saginaw—*M. J. L.*	3	0	0	0	0	----	----	33	3	0	0	33	4	100	3	0	0	----	----	0	0
Lapeer—A. N.	4	100	2	0	0	----	----	100	6	0	0	100	8	0	0	0	0	----	----	0	0
Port Huron—*S. W. S.*	4	25	10	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	50	4
Port Huron—A. A. W.	4	75	4	----	----	----	----	50	6	25	6	100	5	----	----	----	----	----	----	75	6
Port Sanilac ..... *k*	2	50	1	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Saginaw City—N. D. L. *l*	4	0	0	0	0	----	----	50	5	0	0	100	2	0	0	0	0	----	----	0	0
Saginaw City—*L. N. S. m*	4	75	5	0	0	----	----	75	7	0	0	100	4	25	7	0	0	----	----	0	0
Thornville	4	100	1	0	0	----	----	0	0	0	0	100	5	0	0	0	0	----	----	0	0
SOUTH-WESTERN DIV.†	*34*	*75*	*5*	*0*	*0*	*100*	*4*	*58*	*4*	*0*	*0*	*67*	*3*	*50*	*3*	*0*	*0*	*0*	*0*	*75*	*2*
Allegan	4	0	0	0	0	----	----	0	0	0	0	50	4	0	0	0	0	----	----	0	0
Dowagiac—*C. W. M. n*	4	75	3	----	----	----	----	----	----	----	----	25	3	----	----	----	----	----	----	----	----

DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
a Diphtheritic sore throat	67	5
b Spasmodic croup	25	5
c Bilious colic	25	2
d Very healthy indeed, June 22.		
e Anemia	100	1
e Eczema	25	2
e Hysteria	25	3
e Metrorrhagia	100	3
e Leucorrhea	25	1
f Bright's disease	50	4
g Sore throat	25	2
h Mumps	75	3
i Meningitis	25	2
i Spasmodic croup	50	3
j See note *j* for June, below.		
k Healthful, week ending June 8; no disease to report, June 15. The influenza reported occurred during the week ending June 29.		
l Very little sickness, June 8, 22, and 24.		
m The city is generally healthy, June 15.		
n Mumps	100	2
o Ataxia locomotor	33	5
o Hepatitis	67	1
o Metritis, chronic	33	2
o Myelitis	100	3
o Capillary bronchitis	33	5
p Mumps	67	4
q General health good, June 15; no special disease prevailing, June 22.		
r Meningitis	25	6
r Spasmodic croup	25	6
s Peritonitis	25	3
s Rotheln	25	4

Mattawan ..... o	3	0	0	0	0	----	----	0	0	0	0	67	2	0	0	0	0	----	----	0	0		Anemia and asthma, each	25	2
New Troy—L. H. D. ..... p	3	0	0	0	0	100	4	67	5	0	0	33	3	0	0	0	0	----	----	0	0		Bilious colic, cystitis, eczema, gonorrhea, hepatitis, laryngitis, leucorrhea, and epilepsy, each.	25	3
Niles—*O. P. H.* ..... q	4	0	0	0	0	----	----	100	2	0	0	100	3	0	0	0	0	----	----	0	0				
Niles—J. S. R. ..... r	4	75	6	0	0	----	----	75	6	----	----	100	2	0	0	0	0	----	----	0	0				
Otsego ..... s		0	0	0	0	----	----	0	0	0	0	75	2	0	0	0	0	----	----	0	0	t			
Paw Paw ..... t	4	0	0	0	0	----	----	25	2	0	0	75	3	0	0	0	0	----	----	50	2		Metrorrhagia	100	3
St. Joseph	4	0	0	0	0	----	----	25	3	0	0	0	0	50	3	0	0	----	----	100	1		Spinal abscess	75	1
SOUTH'N-CENTRAL DIV.† ..	*52*	*100*	*2*	*0*	*0*	*63*	*5*	*60*	*4*	*75*	*4*	*73*	*4*	*50*	*6*	*0*	*0*	*100*	*6*	*38*	*7*		Gastritis and vaginitis, ea.	50	3
Adrian	4	0	0	0	0	----	----	0	0	0	0	50	2	25	2	0	0	----	----	0	0		Epilepsy	25	3
Albion ..... u	4	100	1	0	0	----	----	100	6	0	0	100	6	75	10	----	----	----	----	50	11	u	Amount of sickness very slight, June 29.		
Brooklyn	4	0	0	0	0	----	----	0	0	0	0	25	3	0	0	0	0	----	----	0	0	v	Syphilis	100	5
Coldwater	4	0	0	0	0	----	----	0	0	0	0	100	3	0	0	0	0	----	----	0	0		Catarrh, chronic	25	4
Jackson—W. W.	4	100	2	0	0	----	----	0	0	0	0	75	4	0	0	0	0	----	----	0	0	w	Diabetes	25	3
Jackson (State Prison) .. v	4	----	----	----	----	----	----	----	----	----	----	100	2	----	----	----	----	100	6	----	----		Diabetes, mel.	75	4
Kalamazoo	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0		Erythema	25	3
Marshall	4	0	0	0	0	----	----	50	3	0	0	25	2	0	0	0	0	----	----	0	0		Catarrh	100	8
Mendon—*H. C. C.*		0	0	0	0	----	----	100	5	0	0	100	5	0	0	0	0	----	----	0	0	x	Pharyngitis	100	4
Mendon—E. S. ..... w	4	0	0	0	0	25	4	25	4	75	4	50	3	0	0	0	0	----	----	0	0		Continues healthy, weeks ending June 8, 22, and 29.		
Sturgis	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0				
Three Rivers x	4	100	3	0	0	100	6	0	0	0	0	100	7	0	0	0	0	----	----	0	0	y	No illness but intermittents, w'k ending June 8.		
Ypsilanti ..... y	4	0	0	0	0	----	----	25	3	0	0	0	0	0	0	0	0	----	----	25	3		Very little illness, 2 weeks ending June 22.		
SOUTH-EASTERN DIV.†	*40*	*72*	*3*	*100*	*12*	----	----	*63*	*6*	*0*	*0*	*88*	*5*	*100*	*7*	*0*	*0*	----	----	*70*	*7*				
Detroit—L. C.	4	100	4	100	12	----	----	100	13	0	0	100	9	100	9	0	0	----	----	100	7				
Detroit—*E. L.*	4	100	3	0	0	----	----	100	9	----	----	100	7	100	5	0	0	----	----	100	10				
Detroit—W. H. R. ..... z	4	100	5	0	0	----	----	100	6	0	0	75	4	0	0	0	0	----	----	25	11		Rheumatism (myalgia)	25	5
Milford	4	100	2	0	0	----	----	25	5	0	0	50	4	0	0	0	0	----	----	0	0	z	Very healthy, 3 weeks ending June 29.		
Northville ..... aa	4	25	2	0	0	----	----	25	3	0	0	75	4	0	0	0	0	----	----	25	1				
Pontiac—W. G. E.	4	25	4	0	0	----	----	0	0	0	0	100	3	0	0	0	0	----	----	0	0	aa	Malarial type to everything, and quite a good many cases, June 15.		
Utica—G. G. R. ..... bb	4	75	2	0	0	----	----	75	6	0	0	100	4	0	0	0	0	----	----	0	0				
Walled Lake	4	25	3	0	0	----	----	25	3	0	0	0	0	0	0	0	0	----	----	0	0				
Washington cc	4	100	4	0	0	----	----	50	5	0	0	100	2	0	0	0	0	----	----	100	4	bb	Dyspepsia	100	2
Wyandotte—E. P. C.	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----		Dropsy	50	4
																							Eczema	25	2
																							General debility	75	3
																						cc	Ovarian dropsy	25	5
																							Pharyngitis	50	3
																							Rheumatic gout	75	4
																							Urinary disease	25	4

* For names of observers, see Exhibit 31, pages 420-1.
† For counties in each division, see Exhibit 1, page 153. The numbers on this line are an average for the division.
‡, §, ||, ¶. For these references, see foot-notes on page 449; for comments on the table, see pages 399, 403, 421.
a, b, c, etc. These letters refer across the page, from the names of observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.
t No change to note, two weeks ending June 15. Little change to note, June 22. Miasm all about us, June 8. Intermittent altogether, June 15. Remarkably healthy, June 22. Some scarlet fever, not much change otherwise, June 29.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Five Weeks ending* **August** *3, 1878.*

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initals are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.	
		Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	285	66	4.1	20	5.5	60	5.1	56	4.5	96	5.1	20	3.0	55	4.5	74	3.1	58	5.8	58	6.0	96	1.5	79	2.9	57	8.7	60	5.4
UPPER-PENIN. DIVISION†	*8*	*38*	*4*	----	----	*63*	*3*	*88*	*3*	*63*	*6*	----	----	----	----	*100*	*3*	*63*	*5*	*25*	*6*	----	----	*100*	*3*	*75*	*6*	----	----
Calumet	4	50	5	----	----	100	4	100	4	25	6	----	----	----	----	100	2	100	5	25	6	----	----	100	3	75	6	----	----
Houghton	4	25	3	----	----	25	2	75	2	100	5	----	----	----	----	100	3	25	4	----	----	----	----	----	----	----	----	----	----
NORTH-WESTERN DIV.†	*3*	*33*	*5*	*0*	*0*	*100*	*1*	*100*	*3*	*100*	*8*	*0*	*0*	*0*	*0*	*100*	*5*	*33*	*6*	*0*	*0*	*100*	*3*	*100*	*4*	*0*	*0*	*67*	*8*
Manistee	3	33	5	0	0	100	1	100	3	100	8	0	0	0	0	100	5	33	6	0	0	100	3	100	4	0	0	67	8
NORTH-EASTERN DIV.†	*5*	*40*	*4*	*0*	*0*	*100*	*3*	*80*	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*4*	*80*	*4*	*0*	*0*	*80*	*5*	*40*	*6*	*0*	*0*	*0*	*0*
Alpena	5	40	4	0	0	100	3	80	4	0	0	0	0	0	0	100	4	80	4	0	0	80	5	40	6	0	0	0	0
WESTERN DIVISION†	*19*	*43*	*4*	*0*	*0*	*44*	*4*	*60*	*4*	*56*	*4*	*0*	*0*	*0*	*0*	*79*	*3*	*78*	*5*	*0*	*0*	*79*	*2*	*68*	*2*	*0*	*0*	*0*	*0*
Grand Haven	5	0	0	0	0	60	3	80	5	0	0	0	0	0	0	100	3	100	4	0	0	100	1	60	3	0	0	0	0
Grand Rapids	4	50	5	0	0	25	5	0	0	100	5	0	0	0	0	75	5	50	6	0	0	100	2	100	1	0	0	0	0
Holland	5	60	3	----	----	----	----	40	3	20	3	----	----	----	----	40	3	0	0	0	0	20	3	100	2	0	0	0	0
Ludington	5	20	3	0	0	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	100	1	20	2	0	0	0	0
CENTRAL DIVISION†	*49*	*63*	*4*	*0*	*0*	*56*	*6*	*34*	*5*	*100*	*5*	*20*	*3*	*54*	*4*	*50*	*4*	*32*	*6*	*60*	*4*	*98*	*1*	*70*	*3*	*25*	*11*	*64*	*5*
Charlotte	4	100	4	0	0	100	7	100	8	100	12	0	0	75	10	100	1	50	13	0	0	100	3	100	5	25	11	100	9
DeWitt	5	0	0	0	0	0	0	0	0	100	4	0	0	80	1	20	4	0	0	40	4	80	2	80	2	0	0	0	0
Elsie	5	0	0	0	0	0	0	20	3	0	0	0	0	20	3	60	2	0	0	0	0	100	1	80	2	0	0	0	0
Hastings	5	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
Howell	5	100	3	0	0	0	0	0	0	100	3	0	0	0	0	20	7	0	0	0	0	100	1	20	2	0	0	60	5
Hubbardston	5	----	----	----	----	20	4	----	----	100	6	----	----	----	----	20	4	20	3	----	----	100	1	100	2	----	----	----	----
Ionia	5	40	6	0	0	0	0	20	6	100	5	0	0	0	0	40	5	0	0	0	0	100	1	100	2	0	0	0	0
North Lansing	5	0	0	0	0	0	0	40	5	100	2	20	3	40	3	60	4	20	5	80	3	100	1	40	4	0	0	0	0
Otisville	5	60	4	0	0	0	0	20	5	100	2	0	0	60	4	100	3	0	0	0	0	100	2	40	5	0	0	0	0
Ovid	5	20	4	0	0	0	0	20	1	0	0	0	0	0	0	40	3	40	3	0	0	0	0	80	2	0	0	40	2
NORTHERN-CENTRAL DIV.†	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*40*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*40*	*2*	*60*	*3*	*20*	*4*	*80*	*1*	*0*	*0*	*0*	*0*	*20*	*3*
Big Rapids—*I. W. B.*	5	0	0	0	0	0	0	40	3	0	0	0	0	0	0	40	2	60	3	20	4	80	1	0	0	0	0	20	3
BAY AND EASTERN DIV.†	*45*	*83*	*5*	*0*	*0*	*63*	*6*	*63*	*5*	*100*	*6*	*0*	*0*	*40*	*7*	*83*	*3*	*73*	*6*	*60*	*6*	*100*	*1*	*90*	*4*	*0*	*0*	*60*	*6*
Bay City—W. H. B.	5	20	7	0	0	100	4	80	6	100	7	0	0	0	0	100	3	40	9	0	0	100	1	100	2	0	0	0	0
Bay City—W. R. M.*h*	5	100	5	0	0	40	5	40	4	100	5	0	0	20	5	100	3	0	0	40	5	100	1	100	5	0	0	0	0
Lapeer—A. N.	5	40	9	0	0	60	9	80	8	100	9	0	0	80	8	100	2	100	7	40	6	100	1	40	7	0	0	100	5
Port Huron—*S. W. S.*	5	100	8	0	0	100	9	100	6	100	11	0	0	0	0	100	3	100	4	100	11	100	2	100	3	0	0	100	10
Port Huron—A. A. W.	5	100	3	0	0	60	5	20	5	100	3	0	0	0	0	0	0	60	5	0	0	100	2	100	2	0	0	0	0
Port Sanilac	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	1	0	0	0	0	0	0	0	0	0	0	0	0
Saginaw City—N. D. I.	5	100	3	0	0	20	2	0	0	100	3	0	0	0	0	20	3	0	0	40	4	100	1	0	0	0	0	20	4
Saginaw City—*I. N. S.*	5	100	3	0	0	60	6	60	5	100	2	0	0	20	7	100	5	80	4	80	5	100	1	100	5	0	0	20	5
Thornville	5	100	3	0	0	0	0	60	4	100	6	0	0	0	0	100	3	60	7	0	0	100	1	0	0	0	0	0	0
SOUTH-WESTERN DIV.†	*33*	*54*	*3*	*20*	*5*	*40*	*4*	*40*	*5*	*93*	*3*	*0*	*0*	*100*	*5*	*73*	*3*	*23*	*5*	*0*	*0*	*100*	*1*	*72*	*2*	*0*	*0*	*60*	*5*
Allegan	5	0	0	0	0	60	5	60	5	100	5	0	0	100	5	100	2	20	7	0	0	100	2	100	3	0	0	0	0

Dowagiac—*C. W. M.*	5	----	----	----	----	20	3	----	----	----	----	----	----	----	----	80	2	----	----	----	--	100		----		----	----	----	----
New Troy—L. H. D.	3	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	3	0	0	100		0	0	0	0	0	0
Niles—J. S. R.	5	60	3	0	0	0	0	40	7	100	3	0	0	0	0	60	5	0	0	0	0	100	1	20	2	0	0	60	5
Otsego	5	0	0	20	5	0	0	0	0	0	0	0	0	0	0	100	2	20	4	0	0	100	1	40	3	0	0	0	0
Paw Paw	5	20	3	0	0	40	3	20	3	0	0	0	0	0	0	80	3	0	0	0	0	100	1	100	2	0	0	0	0
St. Joseph	5	0	0	0	0	0	0	0	0	80	1	0	0	0	0	20	2	0	0	0	0	100	1	100	1	0	0	0	0
SOUTHERN-CENTRAL DIV. †	*69*	*67*	*3*	*20*	*6*	*35*	*7*	*54*	*4*	*98*	*5*	*0*	*0*	*67*	*3*	*78*	*3*	*53*	*6*	*67*	*7*	*97*	*1*	*78*	*2*	*80*	*6*	*30*	*4*
Adrian	5	20	2	0	0	0	0	40	3	80	3	0	0	0	0	40	2	0	0	0	0	100	1	0	0	0	0	0	0
Albion	5	100	6	0	0	80	7	100	6	100	3	0	0	0	0	100	8	60	9	100	8	100	2	100	3	0	0	0	0
Brooklyn	5	0	0	0	0	0	0	0	0	0	0	0	0	80	2	0	0	0	0	0	0	100	1	80	3	0	0	0	0
Clinton	5	0	0	20	6	0	0	20	5	100	6	0	0	0	0	80	2	0	0	60	5	100	1	80	3	0	0	20	4
Coldwater	5	0	0	0	0	0	0	80	3	0	0	0	0	0	0	100	1	80	3	0	0	100	1	100	2	0	0	0	0
Jackson—W. W. *r*	5	20	1	0	0	0	0	20	3	100	3	0	0	0	0	80	3	0	0	0	0	80	3	100		0	0	20	5
Jackson (State Prison)	5	100	1	----	----	----	----	----	----	100	4	----	----	----	----	20	4	----	----	40	7	100	3	----	--	80	6	----	----
Kalamazoo	5	0	0	0	0	20	6	0	0	100	5	0	0	100	3	100	3	0	0	0	0	100	1	20	5	0	0	0	0
Marshall	5	40	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	40	2	0	0	0	0
Mendon—H. C. C.	5	100	3	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	40	4
Mendon—E. S.	4	50	3	0	0	0	0	25	2	100	2	0	0	0	0	50	2	0	0	0	0	75	1	75	1	----	----	0	0
Sturgis	5	0	0	0	0	20	6	80	4	100	5	0	0	0	0	100	3	20	5	0	0	100	1	60	2	0	0	0	0
Three Rivers *u*	5	100	3	0	0	20	8	60	7	100	9	0	0	0	0	100	4	0	0	0	0	100	1	100	2	0	0	0	0
Ypsilanti *v*	5	0	0	0	0	0	0	0	0	0	0	0	0	20	3	0	0	0	0	0	0	100	1	80	2	0	0	40	3
SOUTH EASTERN DIV. †	*49*	*79*	*5*	*0*	*0*	*84*	*6*	*67*	*5*	*100*	*6*	*0*	*0*	*20*	*5*	*80*	*2*	*68*	*7*	*65*	*7*	*98*	*2*	*90*	*3*	*53*	*10*	*95*	*7*
Detroit—L. C.	5	100	6	0	0	60	9	60	6	100	8	0	0	0	0	100	3	100	12	100	11	100	2	100	6	0	0	100	8
Detroit—*E. L.*	5	60	13	0	0	100	8	80	8	100	11	0	0	0	0	100	3	100	11	0	0	100	2	100		20	12	100	10
Detroit—W. H. R. *x*	5	100	7	0	0	100	4	100	4	100	7	0	0	0	0	100	3	60	13	100	10	100	2	100	4	100	12	0	0
Milford	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	50	4	50	4	0	0	100	1	0	0	0	0	0	0
Northville	5	0	0	0	0	0	0	0	0	0	0	0	0	20	5	20	3	0	0	40	4	100	1	60	2	0	0	100	3
Pontiac—W. G. E.	5	0	0	0	0	100	5	100	4	100	7	0	0	0	0	100	2	80	4	0	0	100	1	80	6	0	0	0	0
Utica—G. G. R.	5	0	0	0	0	60	5	0	0	100	6	0	0	0	0	60	3	20	4	0	0	100	1	100	2	40	5	80	5
Walled Lake	5	20	1	0	0	0	0	20	3	100	4	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
Washington	5	100	3	0	0	0	0	0	0	100	4	0	0	0	0	100	3	0	0	0	0	80	4	0	0	0	0	0	0
Wyandotte—E. P. C.	5	0	0	0	0	0	0	40	2	100	3	0	0	0	0	80	2	60	3	20	3	100	1	80	2	0	0	0	0

* For names of observers, see Exhibit 31, pages 420–1; for comments on the table, see pages 399, 403, 421.

† For counties in each division, see Exhibit 1, page 153. The numbers on this line are an average for the division.

‡, §, ‖. For these references, see foot-notes on page 449.

h Scarlet fever increasing, but it is light in character, July 6. No change, children are the victims mostly, July 13. Nothing to change, July 20. Summer complaints mostly, July 27. Summer complaints prevail, not much other change, Aug. 3. The erysipelas reported by this observer July 20 was traumatic.

r During the past two weeks, which have been characterized by continued very high temperature, very little sickness has occurred generally speaking, and but one death from sunstroke, with several cases of prostration from heat. The list of last week was more numerous than that for the preceding week, with a decided increase in remittent and bilious disorders.—July 24.

u Continues healthy, 5 weeks ending Aug. 3. Not much sickness for this season of the year, Aug. 3.—*C. W. Backus, M. D., Three Rivers.*

v Very little illness, 5 weeks ending Aug. 3. The usual "summer complaint" amongst children has not appeared, Aug. 4. Off year for doctors and undertakers.—*Edward Batwell, M. D., Ypsilanti.*

x Very little sickness; there have been a few cases of "summer complaint" which yield readily to treatment,—July 6. Very healthy; the ordinary summer difficulties have made their appearance, but as yet not severe,—July 13. Not much sickness; some trouble from the excessive heat; bowel difficulties in children have appeared; have heard of scarlatina, but authority not good,—July 20. Very little sickness; some increase of erysipelas, nothing worthy of note,—July 27. Health of city good, Aug. 3.

TABLE 3.—*Diseases, by Localities in Michigan, Five Weeks ending* **August** *3, 1878*—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Influenza. Per ct. of Weeks Present.‡	Influenza. Av. Ord. of Prev. when Present.§	Measles. Per ct. of Weeks Present.‡	Measles. Av. Ord. of Prev. when Present.§	Neuralgia.¶ Per ct. of Weeks Present.‡	Neuralgia.¶ Av. Ord. of Prev. when Present.§	Pneumonia. Per ct. of Weeks Present.‡	Pneumonia. Av. Ord. of Prev. when Present.§	Puerperal Fever. Per ct. of Weeks Present.‡	Puerperal Fever. Av. Ord. of Prev. when Present.§	Rheumatism. Per ct. of Weeks Present.‡	Rheumatism. Av. Ord. of Prev. when Present.§	Scarlatina. Per ct. of Weeks Present.‡	Scarlatina. Av. Ord. of Prev. when Present.§	Small-pox. Per ct. of Weeks Present.‡	Small-pox. Av. Ord. of Prev. when Present.§	Tonsilitis.¶ Per ct. of Weeks Present.‡	Tonsilitis.¶ Av. Ord. of Prev. when Present.§	Whooping-cough. Per ct. of Weeks Present.‡	Whooping-cough. Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	285	64	4.2	62	6.2	60	4.7	53	6.0	40	4.5	79	4.6	66	4.8	20	3.3	67	5.5	79	4.0
UPPER-PENINSULAR DIV.†	8	25	1	50	5	----	----	75	6	----	----	100	5	100	2	----	----	50	6	----	----
Calumet	4	----	----	50	5	----	----	75	6	----	----	100	5	100	2	----	----	----	----	----	----
Houghton	4	25	1	----	----	----	----	----	----	----	----	----	----	100	2	----	----	50	6	----	----
NORTH-WESTERN DIV.†	3	0	0	0	0	----	----	0	0	0	0	100	7	0	0	0	0	----	----	0	0
Manistee	3	0	0	0	0	----	----	0	0	0	0	100	7	0	0	0	0	----	----	0	0
NORTH-EASTERN DIV.†	5	60	5	100	2	----	----	20	5	0	0	80	5	0	0	0	0	----	----	100	1
Alpena	5	60	5	100	2	----	----	20	5	0	0	80	5	0	0	0	0	----	----	100	1
WESTERN DIVISION†	19	100	3	0	0	----	----	50	5	0	0	50	5	0	0	0	0	----	----	0	0
Grand Haven	5	0	0	0	0	----	----	40	7	0	0	40	6	----	----	----	----	----	----	----	----
Grand Rapids	4	100	3	0	0	----	----	75	6	0	0	100	6	0	0	0	0	----	----	0	0
Holland a	5	0	0	0	0	----	----	40	3	----	----	20	3	0	0	0	0	----	----	0	0
Ludington b	5	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
CENTRAL DIVISION†	49	67	4	40	7	----	----	47	7	40	5	92	4	67	3	20	3	----	----	87	3
Charlotte	4	100	4	0	0	----	----	100	11	0	0	100	6	0	0	0	0	----	----	0	0
DeWitt c	5	0	0	0	0	----	----	0	0	40	5	100	3	0	0	0	0	----	----	0	0
Elsie d	5	0	0	0	0	----	----	20	4	0	0	0	0	20	4	0	0	----	----	0	0
Hastings e	5	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Howell	5	0	0	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0
Hubbardston f	5	40	3	40	7	----	----	60	6	----	----	60	6	----	----	----	----	----	----	----	----
Ionia	5	0	0	0	0	----	----	0	0	0	0	0	0	100	3	0	0	----	----	100	5
North Lansing g	5	0	0	0	0	----	----	0	0	40	4	100	3	0	0	20	3	----	----	0	0
Otisville	5	0	0	0	0	----	----	20	5	0	0	0	0	0	0	0	0	----	----	100	1
Ovid	5	0	0	0	0	----	----	0	0	0	0	0	0	80	2	20	2	----	----	60	4
NORTH'N-CENTRAL DIV.†	5	0	0	0	0	----	----	0	0	0	0	40	4	0	0	0	0	----	----	0	0
Big Rapids—*I. W. B.*	5	0	0	0	0	----	----	0	0	0	0	40	4	0	0	0	0	----	----	0	0
BAY AND EASTERN DIV.†	45	60	4	40	6	----	----	64	5	0	0	98	5	48	5	20	5	----	----	70	6
Bay City—W. H. B.	5	20	6	0	0	----	----	0	0	0	0	100	7	80	6	0	0	----	----	0	0
Bay City—W. R. M. h	5	100	2	0	0	----	----	20	5	0	0	80	4	100	4	20	5	----	----	0	0
Lapeer—A. N.	5	80	3	0	0	----	----	100	5	0	0	100	9	0	0	0	0	----	----	0	0
Port Huron—*S. W. S.* i	5	40	10	0	0	----	----	0	0	0	0	100	8	0	0	0	0	----	----	100	4
Port Huron—A. A. W.	5	100	5	0	0	----	----	80	5	0	0	100	6	0	0	0	0	----	----	40	8
Port Sanilac	5	40	1	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Saginaw City—N. D. L. j	5	0	0	0	0	----	----	60	4	0	0	100	2	20	4	0	0	----	----	0	0
Saginaw City—*I. N. S.* k	5	40	5	40	6	----	----	60	4	0	0	100	2	20	4	0	0	----	----	0	0
Thornville l	5	60	2	0	0	----	----	0	0	0	0	100	5	20	7	0	0	----	----	0	0
SOUTH-WESTERN DIV.†	33	40	3	0	0	50	4	20	8	0	0	57	4	40	5	0	0	----	----	80	2
Allegan	5	0	0	0	0	----	----	0	0	0	0	0	0	40	5	0	0	----	----	0	0
Dowagiac—*C. W. M.* m	5	20	1	----	----	----	----	----	----	----	----	20	3	----	----	----	----	----	----	----	----
New Troy—*L. H. D.* n	3	0	0	0	0	33	5	0	0	0	0	100	4	0	0	0	0	----	----	0	0

	DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
a	Bilious fever	20	2
	Bilious remittent fever	80	2
	Nervous fever	60	3
	Bilious colic	20	3
	Jaundice	20	3
	Peritonitis	20	4
b	Mumps	40	3
c	Anemia	20	1
	Asthma	20	5
	Abortion	20	4
	Headache, colic, synovitis, and thrush, each	20	3
	Constipation, hystralgia, sunstroke, and eczema, each	20	2
	Endo-metritis	40	3
	Dysmenorrhea	20	4
	Hysteria	40	4
	Scrofula	80	4
d	Herpes zona	20	3
e	Spinal meningitis, 1 case	50	----
f	Sore throat	60	3
g	Mumps	40	4
h	See note *h* for July, p. 447.		
i	Sun-stroke, 3 cases, week ending July 20.		
j	Very little sickness, 3 w'ks ending July 20.		
k	Very healthy, Aug. 2		
l	The month of July has been healthy almost beyond precedent, July 27.		
m	Mumps	60	3
n	Mumps	67	4
o	No sunstroke July 20.		
	Anthrax, goitre, gastralgia, chicken-pox, spermatorrhea, spinal abscess, peritonitis, and orchitis, each	20	3

Niles—J. S. R.	5	60	5	0	0	----	----	20	8	0	0	80	4	0	0	0	0	----	----	0	0	p	Dyspepsia	40	4
Otsego ... o	5	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0		Epilepsy	40	4
Paw Paw ... p	5	0	0	0	0	60	3	0	0	0	0	80	3	0	0	0	0	----	----	0	0		Metrorrhagia	40	3
St. Joseph ... q	5	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	80	2		Strangury	40	3
SOUTH'N-CENTRAL DIV.†	*69*	*68*	*3*	*0*	*0*	*100*	*6*	*43*	*5*	*0*	*0*	*86*	*4*	*60*	*6*	*0*	*0*	*80*	*5*	*56*	*4*		Urticaria	20	4
Adrian	5	0	0	0	0	----	----	20	3	0	0	60	2	20	3	0	0	----	----	20	3		Vaginitis	20	4
Albion	5	100	2	0	0	----	----	80	8	0	0	100	8	100	9	0	0	----	----	80	8	q	Sun stroke	40	2
Brooklyn	5	0	0	0	0	----	----	40	4	0	0	60	3	0	0	0	0	----	----	0	0	r	Laryngitis	20	2
Clinton	5	0	0	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0		See note r for July, p. 447.		
Coldwater	5	0	0	0	0	----	----	60	4	0	0	100	3	0	0	0	0	----	----	0	0	s	Syphilis	100	5
Jackson—W. W. ... r	5	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	40	4		Diabetes	75	3
Jackson (State Prison) ... s	5	----	----	----		----	----	----	----	----	----	100	2	----	----	----		80	5	----	----		Diabetes mel., spinal anemia, and spinal congestion, each		
Kalamazoo	5	0	0	0		----	----	0	0	0	0	0	0	0	0	0	0	----	----	100	3	t		25	3
Marshall	5	40	2	0	0	----	----	40	4	0	0	60	3	0	0	0	0	----	----	0	0		Sciatica	50	3
Mendon—H. C. C.	5	0	0	0	0	----	----	20	4	0	0	100	5	0	0	0	0	----	----	0	0		Catarrh and jaundice, each	20	7
Mendon—E. S. ... t	4	25	2	0	0	----	----	0	0	0	0	75	2	0	0	0	0	----	----	0	0	u	Pharyngitis	20	6
Sturgis	5	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0		See note u for July, p. 447.		
Three Rivers ... u	5	100	5	0	0	100	6	0	0	0	0	100	7	0	0	0	0	----	----	0	0	v	See note v for July, p. 447.		
Ypsilanti ... v	5	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	40	3	w	Mumps	60	6
SOUTH-EASTERN DIV.†	*49*	*76*	*7*	*70*	*9*	----	----	*80*	*11*	*0*	*0*	*64*	*5*	*100*	*9*	*0*	*0*	----	----	*100*	*5*	x	Sun stroke	25	7
Detroit—L. C.	5	100	11	100	11	----	----	100	13	0	0	100	5	100	12	0	0	----	----	100	8		See note x for July, p. 447.		
Detroit—E. L. ... w	5	80	10	0	0	----	----	40	11	0	0	100	8	100	5	0	0	----	----	100	6	y	Sun stroke	50	5
Detroit—W. H. R. ... x	5	100	8	0	0	----	----	100	8	0	0	100	9	0	0	0	0	----	----	0	0		Two cases of sun stroke, 1 fatal. Death resulting in 2 hours from first attack, week ending July 6.		
Milford ... y	4	50	3	0	0	----	----	0	0	0	0	25		0	0	0	0	----	----	0	0				
Northville	5	40	3	0	0	----	----	0	0	0	0	20	4	0	0	0	0	----	----	100	1				
Pontiac—W. G. E.	5	0	0	40	5	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0				
Utica—G. G. R. ... z	5	0	0	0	0	----	----	0	0	0	0	80	5	0	0	0	0	----	----	0	0				
Walled Lake	5	80	4	0	0	----	----	0	0	0	0	20	3	0	0	0	0	----	----	0	0	z	Dyspepsia	60	3
Washington ... aa	5	0	0	0	0	----	----	0	0	0	0	100	3	0	0	0	0	----	----	100	3	aa	Acute dyspepsia	20	4
Wyandotte—E. P. C. ... bb	5	0	0	0	0	----	----	0	0	0	0	20	3	0	0	0	0	----	----	0	0		Eczema	80	1
																							Irritability of urinary organs	20	5
																							Irritability of bladder	20	6
																							Urinary disease	40	4
																							Herpes	40	6
																							Malarial infection	20	1
																							Pharyngitis	40	3
																							Peritonitis	20	6
																						bb	Diphtheritic tonsilitis	20	3

* For names of observers, see Exhibit 31, pages 420–1; for comments on this table, see pages 399, 403, 421.

† For counties in each division see Exhibit 1, page 153. The numbers on this line are an average for those localities within the division at which the disease was reported present during the month.

‡ When less than the full number of reports for the month have been received from any Observer, the number against his name in the column "Per Cent of Weeks Present," for any disease, is the per cent which the number of weeks he reports the disease present is of the number of cards received from him. When less than 2 reports have been received from any Observer for a month of 4 weeks, or less than 3 for a month of 5 weeks, they have not been compiled. When for any week no statement has been made by an Observer, with regard to a disease, and for the other weeks it has been marked 0, the columns for that disease against his name have been left blank. For the purposes of this compilation, each month is made to end on the Saturday nearest the end of the calendar month. In compiling this table, a fraction less than one-half was rejected, a fraction equal to or greater than one-half was counted as one.

§ The disease of which there were the most cases was to be marked 1 in order, on the cards; that of which there was the next greatest number, 2; and so on. Diseases not present were to be marked 0. This column states the average order of prevalence only for those weeks the disease was reported present.

‖ The numbers in this line are statements not for all the localities represented, but for those in which the disease was reported present.

¶ Neuralgia and Tonsilitis were not printed on any of the postal blanks used previously to October, 1878, and were printed on only a part of those used from that time till January, 1879. Hence it is probable that they were not so fully reported during the first nine months of the year as during the last quarter, and not so fully at any time as were the other diseases tabulated.

a, b, c, etc. These letters refer across the page, from the names of observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

For plan of marking the card-reports, see pages 397–8. A summary made from Table 3 is given in Table 2, pages 404–419.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **August** *31, 1878.*

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.	
		Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present. ‡	Av. Ord. of Prev. when Present.§
ALL LOCALITIES	253	79	5.0	38	7.0	69	4.6	79	4.9	91	5.7	25	2.0	68	5.6	89	2.9	72	4.8	61	7.0	97	1.7	86	2.8	52	6.9	65	5.8
UPPER-PENIN. DIVISION†	*12*	*75*	*7*	*0*	*0*	*100*	*3*	*100*	*3*	*75*	*6*	*0*	*0*	*0*	*0*	*100*	*2*	*100*	*4*	*50*	*6*	*0*	*0*	*100*	*2*	*25*	*7*	*0*	*0*
Calumet	4	----	----	----	----	100	3	100	4	25	6	----	----	----	----	100	1	100	4	50	6	----	----	100	2	25	7	----	----
Houghton	4	75	7	0	0	100	3	100	3	100	7	0	0	0	0	100	2	100	3	0	0	0	0	0	0	25	6	0	0
Ishpeming	4	0	0	0	0	100	3	100	2	100	5	0	0	0	0	100	2	100	5	50	6	0	0	0	0	0	0	0	0
NORTH WESTERN DIV.†	*4*	*50*	*9*	*0*	*0*	*100*	*3*	*100*	*4*	*100*	*9*	*0*	*0*	*0*	*0*	*100*	*1*	*100*	*5*	*0*	*0*	*100*	*3*	*100*	*5*	*0*	*0*	*100*	*7*
Manistee	4	50	9	0	0	100	3	100	4	100	9	0	0	0	0	100	1	100	5	0	0	100	3	100	5	0	0	100	7
NORTH-EASTERN DIV.	*4*	*50*	*7*	*0*	*0*	*100*	*3*	*75*	*5*	*50*	*6*	*0*	*0*	*0*	*0*	*100*	*5*	*25*	*7*	*25*	*6*	*50*	*6*	*50*	*5*	*0*	*0*	*0*	*0*
Alpena	4	50	7	0	0	100	3	75	5	50	6	0	0	0	0	100	5	25	7	25	6	50	6	50	5	0	0	0	0
WESTERN DIVISION†	*20*	*68*	*7*	*0*	*0*	*65*	*5*	*88*	*5*	*100*	*8*	*0*	*0*	*63*	*8*	*100*	*3*	*75*	*4*	*25*	*14*	*95*	*2*	*81*	*2*	*63*	*7*	*63*	*9*
Grand Haven	4	25	6	0	0	100	4	0	0	0	0	0	0	50	7	100	2	100	3	0	0	100	3	25	1	0	0	25	8
Grand Rapids	4	0	0	0	0	75	5	0	0	100	5	0	0	0	0	100	3	100	6	0	0	100	3	100	1	25	7	0	0
Holland	4	50	4	0	0	25	4	75	3	0	0	0	0	0	0	100	3	50	4	0	0	75	2	100	1	0	0	0	0
Ludington	4	0	0	0	0	25	3	0	0	0	0	0	0	0	0	100	2	25	3	0	0	100	1	0	0	0	0	0	0
Muskegon	4	100	11	0	0	100	7	100	7	100	11	0	0	75	8	100	3	100	3	25	14	100	3	100	3	100	6	100	10
CENTRAL DIVISION†	*36*	*75*	*5*	*25*	*5*	*25*	*4*	*67*	*4*	*96*	*4*	*0*	*0*	*80*	*4*	*81*	*3*	*40*	*4*	*88*	*5*	*100*	*1*	*86*	*2*	*58*	*6*	*50*	*4*
DeWitt	4	100	4	0	0	0	0	0	0	100	4	0	0	100	2	100	2	0	0	100	4	100	2	100	2	0	0	0	0
Elsie	4	0	0	0	0	25	3	0	0	0	0	0	0	100	3	50	4	25	1	0	0	100	2	75	2	0	0	0	0
Hastings	4	0	0	0	0	0	0	75	4	100	2	0	0	0	0	75	3	0	0	0	0	100	1	0	0	0	0	0	0
Howell	4	100	6	0	0	0	0	0	0	100	5	0	0	0	0	100	5	0	0	0	0	100	1	100	2	100	8	100	4
Hubbardston	4	0	0	0	0	25	4	0	0	75	4	0	0	0	0	25	3	0	0	0	0	100	1	25	2	0	0	0	0
Ionia	4	25	8	0	0	0	0	0	0	100	6	0	0	25	6	100	3	25	4	0	0	100	1	100	2	0	0	0	0
North Lansing	4	100	5	0	0	0	0	100	5	100	4	0	0	100	3	100	3	75	5	75	5	100	1	100	4	50	5	25	4
Otisville	4	75	3	0	0	0	0	0	0	100	3	0	0	75	4	100	3	25	4	0	0	100	1	0	0	0	0	25	5
Ovid	4	50	6	25	5	25	4	25	4	0	0	0	0	0	0	0	0	50	5	0	0	0	0	100	1	25	4	0	0
NORTHERN-CENTRAL DIV.†	*4*	----	----	*0*	*0*	*25*	*3*	*25*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*25*	*3*	*100*	*2*	*25*	*4*	*100*	*1*	*25*	*3*	*50*	*3*	*0*	*0*
Big Rapids—*I. W. B.*	4	----	----	0	0	25	3	25	3	0	0	0	0	0	0	25	3	100	2	25	4	100	1	25	3	50	3	0	0
BAY AND EASTERN DIV	*37*	*92*	*5*	*0*	*0*	*90*	*6*	*87*	*6*	*85*	*6*	*25*	*2*	*73*	*8*	*97*	*2*	*76*	*5*	*92*	*7*	*95*	*2*	*100*	*4*	*25*	*13*	*79*	*7*
Bay City—W. H. B.	4	50	8	0	0	100	5	75	7	100	7	0	0	0	0	100	3	100	9	0	0	100	1	100	2	0	0	100	7
Bay City—W. R. M.	4	100	5	0	0	100	5	100	4	100	5	0	0	0	0	100	2	75	3	0	0	100	1	100	5	0	0	0	0
Lapeer—A. N.	3	0	0	0	0	100	7	100	8	100	11	0	0	67	9	100	1	100	6	0	0	100	2	100	6	0	0	100	4
Port Huron—*S. W. S.*	4	100	9	0	0	100	7	100	6	100	12	0	0	50	11	100	2	100	3	100	12	100	2	100	6	0	0	100	10
Port Huron—A. A. W.	2	100	3	0	0	100	6	0	0	100	6	0	0	0	0	0	0	50	6	0	0	100	2	100	2	0	0	0	0
Port Sanilac	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	50	2	0	0	0	0	0	0
Saginaw City—N. D. L.	4	100	2	0	0	100	4	0	0	100	3	0	0	75	4	100	4	25	3	75	4	100	1	0	0	0	0	0	0
Saginaw City—*I. N. S.*	4	100	4	0	0	100	5	100	8	100	6	0	0	100	9	100	3	100	9	100	5	100	1	100	7	25	13	25	13
Thornville	4	100	3	0	0	25	7	50	5	50	6	0	0	0	0	100	2	75	4	0	0	100	2	0	0	0	0	0	0
West Bay City	4	0	0	0	0	0	0	0	0	25	2	25	2	0	0	75	2	50	3	0	0	100	1	100	2	0	0	75	3

SOUTH-WESTERN DIV.†	*32*	*75*	*4*	*0*	*0*	*38*	*4*	*67*	*6*	*75*	*4*	*0*	*0*	*50*	*8*	*75*	*3*	*64*	*4*	*42*	*7*	*100*	*2*	*71*	*3*	*0*	*0*	*42*	*4*
Allegan	4	0	0	0	0	50	6	100	5	100	5	0	0	50	8	100	2	75	6	0	0	100	2	100	3	0	0	0	0
Dowagiac—*C. W. M.*	4	----	----	----	----	25	2	----	----	----	----	----	----	----	----	100	3	----	----	----	----	100		----	----	----		----	----
Mattawan	4	25	5	0	0	0	0	75	5	75	4	0	0	0	0	50	4	25	3	0	0	100	2	50	1	0	0	50	4
New Troy—L. H. D.	4	100	3	----	----	----	----	----	----	----	----	----	----	----	----	50	4	100	3	25	7	100	1	25	5	----		----	----
Niles—J. S. R.	4	75	5	0	0	0	0	25	2	100	3	0	0	0	0	50	5	25	8	25	12	100	2	100	2	0	0	25	5
Otsego	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	50	3	0	0	100	2	25	3	0	0	0	0
Paw Paw	4	100	3	0	0	25	4	0	0	50	4	0	0	0	0	50	3	100	3	0	0	100	2	100	2	0	0	50	4
St. Joseph	4	0	0	0	0	50	2	0	0	50	3	0	0	0	0	100	2	75	3	75	3	100		100	2	0	0	0	0
SOUTHERN-CENTRAL DIV.†	*66*	*77*	*4*	*50*	*9*	*67*	*6*	*87*	*5*	*98*	*6*	*0*	*0*	*63*	*4*	*93*	*3*	*63*	*5*	*56*	*7*	*98*	*1*	*93*	*2*	*25*	*6*	*58*	*4*
Adrian	4	100	3	0	0	0	0	25	2	75	3	0	0	0	0	100	2	0	0	0	0	100	1	0	0	0	0	50	4
Albion	3	100	6	0	0	67	7	100	6	100	6	0	0	0	0	100	4	100	6	100	8	100	1	100	2	0	0	0	0
Ann Arbor—*J. K.*	4	----	----	----	----	100	4	100	3	100	7	----	----	----	----	100	5	50	8	----	----	100	2	100	2	----		----	----
Battle Creek	4	----	----	----	----	75	5	100	4	----	----	----	----	25	1	75	2	50	4	----	----	100	2	100	3	----		----	----
Brooklyn	4	50	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	25	2	0	0	0	0
Clinton	4	0	0	50	9	0	0	100	8	100	9	0	0	0	0	100	2	75	4	75	10	100		100	4	0	0	75	5
Coldwater	4	25	2	0	0	0	0	100	4	0	0	0	0	0	0	100	3	75	4	0	0	100	1	100	2	0	0	0	0
Hillsdale	3	0	0	0	0	33	5	0	0	0	0	0	0	0	0	67	4	33	4	67	3	100	1	100	2	0	0	67	4
Jackson—W. W.	4	25	4	0	0	50	5	75	3	100	4	0	0	0	0	100	2	0	0	0	0	75	2	100	2	0	0	0	0
Jackson (State Prison)	4	100	2	----	----	----	----	----	----	100	4	----	----	----	----	100	2	----	----	25	7	100	3	----	----	25	6	----	----
Kalamazoo	4	0	0	0	0	50	6	0	0	100	7	0	0	100	6	100	3	25	7	0	0	100		100	2	0	0	50	5
Marshall	4	0	0	0	0	0	0	75	5	0	0	0	0	0	0	100	4	0	0	0	0	100		100	2	0	0	0	0
Mendon—H. C. C.	4	100	4	0	0	0	0	0	0	100	5	0	0	0	0	50	4	0	0	0	0	100		100	2	0	0	0	0
Mendon—E. S.	4	100	3	0	0	0	0	0	0	100	4	0	0	0	0	100	3	0	0	0	0	100	1	75	2	0	0	0	0
Sturgis	4	0	0	0	0	100	5	100	6	100	5	0	0	0	0	100	2	100	3	0	0	100	2	100	2	0	0	0	0
Three Rivers	4	100	6	0	0	50	9	100	4	100	9	0	0	0	0	100	2	0	0	25	8	100	1	100	3	0	0	0	0
Ypsilanti	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	100	1	0	0	50	4
SOUTH-EASTERN DIV.†	*40*	*100*	*6*	*0*	*0*	*73*	*5*	*68*	*5*	*100*	*6*	*0*	*0*	*25*	*3*	*88*	*3*	*89*	*7*	*79*	*8*	*95*	*2*	*88*	*3*	*88*	*9*	*75*	*6*
Detroit—L. C.	4	100	3	0	0	0	0	0	0	100	6	0	0	0	0	100	5	100	11	100	11	100	2	100	8	0	0	100	7
Detroit—*E. L.*	4	100	13	0	0	100	4	100	6	100	10	0	0	0	0	100	4	100	8	0	0	100	2	100	1	0	0	100	11
Detroit—W. H. R. z	4	100	7	0	0	100	5	100	7	100	7	0	0	0	0	100	2	75	13	100	11	100	2	100	3	100	12	0	0
Milford	4	100	2	----	----	25	5	25	5	----	----	----	----	----	----	100	4	100	3	----	----	100	1	----	----	75	6	----	----
Monroe—*P. S.*	4	----	----	----	----	75	4	50	3	----	----	----	----	25	3	50	5	----	----	50	5	100	2	----	----	----		50	1
Northville	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	4	0	0	50	4	100	2	50	3	0	0	100	4
Utica—G. G. R.	4	0	0	0	0	100	7	100	5	100	7	----	----	0	0	100	5	100	5	0	0	100	1	100	2	0	0	50	5
Walled Lake	4	0	0	0	0	0	0	50	5	100	4	0	0	0	0	50	2	0	0	0	0	100	2	25	3	0	0	0	0
Washington	4	100	3	0	0	0	0	25	5	100	4	0	0	0	0	100	1	100	4	0	0	50	3	100	5	0	0	50	5
Wyandotte—E. P. C. ee	4	0	0	0	0	25	3	75	3	100	4	0	0	0	0	100	2	50	3	0	0	100		100	2	0	0	0	0
Wyandotte—*T. J. L.*	2	0	0	0	0	100	4	100	5	100	7	0	0	0	0	100	4	0	0	0	0	100		100	2	0	0	100	7

* For names of observers, see Exhibit 31, pages 420–1.
† For counties in each division, see Exhibit 1, page 153. The numbers on this line are an average for the division.
‡, §, ‖. For these references, see foot-notes on page 449. For comments on the table, see pages 399, 403, 421.
z But little sickness; ulcerated throats may be a little more common; not much of the ordinary summer complaints.—Aug. 10. Health of city good, July 17. Very healthy, some cases of scarlatina have been reported, but I have seen none; very little of summer complaint,—Aug. 24. Very healthy, few cases of acute diseases; scarlatina is reported, but I have seen none,—Aug. 31.
ee In last week's report I marked malarial exanthems 2. These have prevailed for several weeks, but have not been recorded as they are not on the card. These diseases are urticaria, erythema, and sometimes herpetic, or oftener of a miliary appearance. They often accompany chills and fever, and very often appear without fever, but with bilious derangements. They have been unusually prevalent this summer, and especially for past two weeks, and some of great severity.—Aug. 26.

TABLE 3.—*Diseases, by Localities in Michigan, Four Weeks ending* **August** *31, 1878*—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Influenza. Per ct. of Weeks Present.††	Influenza. Av. Ord. of Prev. when Present.§	Measles. Per ct. of Weeks Present.††	Measles. Av. Ord. of Prev. when Present.§	Neuralgia.¶ Per ct. of Weeks Present.††	Neuralgia.¶ Av. Ord. of Prev. when Present.§	Pneumonia. Per ct. of Weeks Present.††	Pneumonia. Av. Ord. of Prev. when Present.§	Puerperal Fever. Per ct. of Weeks Present.††	Puerperal Fever. Av. Ord. of Prev. when Present.§	Rheumatism. Per ct. of Weeks Present.††	Rheumatism. Av. Ord. of Prev. when Present.§	Scarlatina. Per ct. of Weeks Present.††	Scarlatina. Av. Ord. of Prev. when Present.§	Small-pox. Per ct. of Weeks Present.††	Small-pox. Av. Ord. of Prev. when Present.§	Tonsilitis.¶ Per ct. of Weeks Present.††	Tonsilitis.¶ Av. Ord. of Prev. when Present.§	Whooping-cough. Per ct. of Weeks Present.††	Whooping-cough. Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	255	66	5.2	60	6.2	63	5.5	68	7.2	33	9.3	78	5.3	73	6.7	25	7.0	45	4.4	79	5.7
UPPER-PENINSULAR DIV.†	*12*	*50*	*7*	*0*	*0*	----	----	*25*	*7*	----	----	*100*	*7*	*92*	*5*	*0*	*0*	----	----	*0*	*0*
Calumet	4	----	----	----	----	----	----	25	7	----	----	100	6	100	5	----	----	----	----	----	----
Houghton	4	50	7	0	0	----	----	0	0	0	0	0	0	100	5	0	0	----	----	0	0
Ishpeming	4	0	0	0	0	----	----	0	0	----	----	100	7	75	6	0	0	----	----	0	0
NORTH-WESTERN DIV.†	*4*	*50*	*8*	*0*	*0*	----	----	*0*	*0*	*0*	*0*	*100*	*10*	*0*	*0*	*0*	*0*	----	----	*0*	*0*
Manistee	4	50	8	0	0	----	----	0	0	0	0	100	10	0	0	0	0	----	----	0	0
NORTH-EASTERN DIV.†	*4*	*0*	*0*	*100*	*3*	----	----	*0*	*0*	*0*	*0*	*25*	*5*	*0*	*0*	*0*	*0*	*75*	*4*	*100*	*1*
Alpena	4	0	0	100	3	----	----	0	0	0	0	25	5	0	0	0	0	75	4	100	1
WESTERN DIVISION†	*20*	*58*	*6*	*0*	*0*	----	----	*50*	*8*	*25*	*7*	*67*	*7*	*50*	*14*	*0*	*0*	----	----	*42*	*10*
Grand Haven *a*	4	25	6	0	0	----	----	25	7	0	0	50	6	0	0	0	0	----	----	50	9
Grand Rapids	4	100	4	0	0	----	----	50	7	25	7	50	7	0	0	0	0	----	----	50	5
Holland *b*	4	0	0	0	0	----	----	75	3	0	0	0	0	0	0	0	0	----	----	0	0
Ludington *c*	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Muskegon	4	50	9	0	0	----	----	50	13	0	0	100	9	50	14	0	0	----	----	25	15
CENTRAL DIVISION†	*36*	*0*	*0*	*0*	*0*	----	----	*58*	*5*	*0*	*0*	*55*	*4*	*75*	*4*	*0*	*0*	----	----	*92*	*3*
DeWitt *d*	4	0	0	0	0	----	----	50	4	0	0	75	4	0	0	0	0	----	----	0	0
Elsie	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	* 0	0
Hastings	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Howell	4	0	0	0	0	----	----	0	0	0	0	100	5	0	0	0	0	----	----	0	0
Hubbardston *e*	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Ionia	4	0	0	0	0	----	----	0	0	0	0	0	0	50	5	0	0	----	----	75	5
North Lansing *f*	4	0	0	0	0	----	----	50	6	0	0	50	5	0	0	0	0	----	----	0	0
Otisville	4	0	0	0	0	----	----	75	4	0	0	25	3	0	0	0	0	----	----	100	2
Ovid	4	0	0	0	0	----	----	0	0	0	0	25	5	100	2	0	0	----	----	100	3
NORTH'N-CENTRAL DIV.†	*4*	*0*	*0*	*25*	*2*	----	----	*0*	*0*	*0*	*0*	*25*	*2*	*0*	*0*	*0*	*0*	----	----	*0*	*0*
Big Rapids—*I. W. B.*	4	0	0	25	2	----	----	0	0	0	0	25	2	0	0	0	0	----	----	0	0
BAY AND EASTERN DIV.†	*37*	*68*	*6*	*25*	*11*	----	----	*100*	*7*	*25*	*11*	*97*	*6*	*75*	*5*	*0*	*0*	----	----	*70*	*6*
Bay City—W. H. B.	4	100	9	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0
Bay City—W. R. M. *g*	4	100	4	0	0	----	----	0	0	0	0	100	5	50	5	0	0	----	----	0	0
Lapeer—A. N.	3	67	3	0	0	----	----	100	8	0	0	100	8	0	0	0	0	----	----	0	0
Port Huron—*S. W. S.*	4	50	8	0	0	----	----	0	0	0	0	100	9	0	0	0	0	----	----	100	4
Port Huron—A. A. W.	2	100	5	0	0	----	----	0	0	0	0	50	7	----	----	----	----	----	----	100	5
Port Sanilac *h*	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Saginaw City—N. D. L.	4	0	0	0	0	----	----	100	4	0	0	100	3	75	4	0	0	----	----	0	0
Saginaw City—*I. N. S.*	4	50	10	25	11	----	----	100	8	25	11	100	4	100	9	0	0	----	----	25	9
Thornville	4	25	2	0	0	----	----	0	0	0	0	100	5	----	----	----	----	----	----	----	----
West Bay City	4	0	0	0	0	----	----	0	0	0	0	0	0	75	2	0	0	----	----	0	0
SOUTH-WESTERN DIV.†	*32*	*33*	*2*	*50*	*4*	*25*	*4*	*25*	*3*	*0*	*0*	*75*	*4*	*0*	*0*	*0*	*0*	*25*	*6*	*0*	*0*
Allegan	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0

	DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Present.††	Av. Order of Prevalence when Present.§
a	Parotitis	25	9
b	Bilious fever	25	3
	Remittent bilious fever	50	2
	Intermittent bilious fever	25	3
	Nervous fever	50	4
	Jaundice	25	4
c	Very little sickness, Aug. 24.		
d	Anemia	50	4
	Cerebral hyperemia	75	4
	Endo-metritis	50	3
	Metrorrhagia	25	4
	Paralysis	25	4
	Synovitis	75	4
e	Chicken-pox	50	4
f	Mumps	50	4
g	See note *g* for Aug., below.		
h	Very healthful, Aug. 17.		
i	Mumps	50	2
j	Acute mania	25	6
	Bright's disease	25	2
	Cirrhosis of liver	25	6
	Metritis	25	1
k	Less sickness in this part of Michigan than ever known, Aug. 10.		
	Sickness light, Aug. 24.		
	Sickness increasing; rheumatism all chronic, Aug. 31.		
l	Cancer	50	9
	Gastritis	50	8
	Gastralgia	50	10
	Gastro-duodenitis	25	7
	Roseola	25	13
m	Measles, imported.		
n	Asthma	25	3
	Cancer of stomach	50	4
	Dyspepsia	100	3
	Menorrhagia	50	4
	Synovitis	25	4
	Spinal Paralysis	25	3

Dowagiac—*C. W. M.*.....*i*	4	25	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----		Vaginitis	50	4
Mattawan.....*j*	4	50	3	0	0	----	----	0	0	0	0	50	4	0	0	0	0	----	----	0	0	*o*	See note *o* for Aug., below.		
New Troy—L. H. D.....*k*	4	----	----	----	----	----	----	----	----	----	----	100	5	----	----	----	----	----	----	----	----	*p*	Acute catarrh	75	2
Niles—J. S. R.....*l*	4	0	0	0	0	----	----	0	0	0	0	100	5	0	0	0	0	25	7	0	0	*q*	No fatal case, week ending Aug. 17.		
Otsego.....*m*	4	0	0	50	4	----	----	0	0	0	0	25	4	0	0	0	0	----	----	0	0				
Paw Paw.....*n*	4	0	0	0	0	25	4	25	3	0	0	100	3	0	0	0	0	25	3	0	0	*r*	Laryngitis	25	1
St. Joseph	4	25	2	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0	*s*	Syphilis	100	5
SOUTH'N-CENTRAL DIV.†..	*66*	*63*	*5*	*0*	*0*	*100*	*7*	*71*	*8*	*50*	*10*	*79*	*5*	*56*	*6*	*0*	*0*	*50*	*4*	*93*	*6*	*t*	Congestion of brain, 1 case fatal.		
Adrian	4	0	0	0	0	----	----	0	0	0	0	100	3	25	3	0	0	----	----	0	0				
Albion	3	100	3	0	0	----	----	67	10	0	0	100	7	100	11	0	0	----	----	100	11		Eczema	25	6
Ann Arbor—*J. K.*	4	----	----	----	----	----	----	----	----	----	----	----	----	75	6	----	----	----	----	----	----		Hepatitis	25	4
Battle Creek.....*o*	4	25	6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	*u*	Anasarca	50	4
Brooklyn	4	0	0	0	0	----	----	0	0	0	0	25	3	0	0	0	0	25	2	0	0		Biliary calculi	50	4
Clinton	4	75	7	0	0	----	----	0	0	25	12	100	6	0	0	0	0	----	----	75	5		Diabetes	25	4
Coldwater.....*p*	4	0	0	0	0	----	----	0	0	0	0	100	5	0	0	0	0	----	----	0	0		Diabetes mel.	75	4
Hillsdale.....*q*	3	0	0	0	0	----	----	0	0	0	0	100	4	33	5	0	0	----	----	0	0	*v*	See note *v* for Aug., below.		
Jackson—W. W.....*r*	4	0	0	0	0	----	----	75	5	0	0	0	0	0	0	0	0	----	----	100	2	*w*	Convulsions	25	7
Jackson (State Prison)..*s*	4	----	----	----	----	----	----	----	----	----	----	100	3	----	----	----	----	75	6	----	----		Functional disturbance of liver.	50	2
Kalamazoo	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	100	4		Continues very healthy for this month of the year, 4 weeks ending Aug. 31.		
Marshall	4	0	0	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0				
Mendon—H. C. C.....*t*	4	0	0	0	0	----	----	0	0	0	0	25	5	0	0	0	0	----	----	0	0				
Mendon—E. S.....*u*	4	25	2	0	0	----	----	0	0	0	0	25	3	0	0	0	0	----	----	0	0				
Sturgis.....*v*	4	0	0	0	0	----	----	0	0	25	7	0	0	50	7	0	0	----	----	0	0	*x, y, z*	See notes *x*, *y*, and *z* for Aug., pp. 451, 453.		
Three Rivers.....*w*	4	100	5	0	0	100	7	0	0	0	0	100	7	0	0	0	0	----	----	0	0				
Ypsilanti.....*x*	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0	*aa*	Bilious fever	50	2
SOUTH-EASTERN DIV.†....	*40*	*100*	*5*	*100*	*11*	----	----	*100*	*11*	*0*	*0*	*91*	*6*	*83*	*11*	*25*	*7*	----	----	*85*	*6*	*bb*	Very healthy for the season, Aug. 17.		
Detroit—L. C.....*y*	4	100	5	100	11	----	----	100	11	0	0	100	3	100	11	25	7	----	----	75	11				
Detroit—*E. L.*	4	100	9	0	0	----	----	100	14	0	0	100	10	100	8	0	0	----	----	100	7	*cc*	Dyspepsia	25	4
Detroit—W. H. R.....*z*	4	100	5	0	0	----	----	100	9	0	0	100	10	50	13	0	0	----	----	0	0	*dd*	Acute dyspepsia	100	4
Milford	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----		Goitre	100	5
Monroe—*P. S.*.....*aa*	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	75	3		Herpes	25	4
Northville.....*bb*	2	100	4	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	100	1		Bilious colic	25	5
Utica—G. G. R.....*cc*	4	0	0	0	0	----	----	0	0	----	----	50	3	0	0	0	0	----	----	0	0		Paralysis	25	5
Walled Lake	4	100	2	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0		Pharyngitis	50	5
Washington.....*dd*	4	0	0	0	0	----	----	0	0	0	0	100	3	0	0	0	0	----	----	75	2	*ee*	Diphtheritic tonsilitis	25	2
Wyandotte—E. P. C...*ee*	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0		Malarial exanthems	50	3
Wyandotte—*T. J. L.*	2	0	0	0	0	----	----	0	0	0	0	100	8	0	0	0	0	----	----	100	9		See note *ee* for Aug., p. 451.		

* For names of observers, see Exhibit 31, pages 420–1.

† For counties in each division, see Exhibit 1, page 153. The numbers on this line are an average for the division.

‡, §, ‖, ¶. For these references, see foot-notes on page 449; for comments on the table, see pages 399, 403, 421.

a, *b*, *c*, etc. These letters refer across the page, from the names of observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

g Not much change, 2 weeks ending Aug. 17. Summer sickness, as usual, Aug. 10. Diseases of children not equal to other seasons at this date; other diseases without much change, Aug. 24. Summer sickness only in excess, less sickness than common for this date other years, Aug. 31.

o Diseases which I do not report, as usual, very little if any, and very light, Aug. 10. Fevers have changed, as you see, and are assuming somewhat of a gastric type, Aug. 17. Less new cases, a few put on typhoid type as yet easily controlled, Aug. 24. Less cases than last week, slight typhoid tendency, none fatal, Aug. 31.

v One case scarlatina, origin unknown, week ending Aug. 17. Puerperal fever and scarlatina, 1 case each, week ending Aug. 24.

x Remittents are on the increase, Aug. 10. Total absence of diseases incidental to Summer and change of food and vegetables. No diarrhea among children, Aug. 17. Miasmatic diseases and complications prevail, Aug. 24.

y Marked absence of all diseases except murder and suicide, week ending Aug. 17.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **September** *28, 1878.*

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.	
		Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡‡	Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	244	84	4.4	25	7.5	50	5.7	57	5.9	92	6.0	42	6.3	69	4.8	81	3.5	69	5.0	57	7.1	98	1.6	94	2.6	57	7.1	74	4.8
UPPER-PENIN. DIVISION†	*11*	*91*	*5*	*0*	*0*	*73*	*4*	*82*	*5*	*100*	*6*	*0*	*0*	----	----	*100*	*2*	*91*	*4*	*64*	*7*	----	----	*100*	*2*	*63*	*6*	----	----
Calumet	4	100	5	----	----	75	5	100	6	100	7	----	----	----	----	100	1	100	6	100	7	----	----	100	2	25	8	----	----
Houghton	4	100	6	0	0	75	4	50	5	100	7	0	0	----	----	100	4	75	4	50	7	----	----	----	----	100	3	----	----
Ishpeming	3	67	4	0	0	67	4	100	3	100	5	0	0	0	0	100	2	100	3	33	6	0	0	0	0	0	0	0	0
NORTH-WESTERN DIV.†	*4*	*75*	*8*	*0*	*0*	*100*	*6*	*75*	*7*	*100*	*8*	*0*	*0*	*0*	*0*	*100*	*4*	*50*	*5*	*25*	*9*	*100*	*1*	*100*	*2*	*50*	*5*	*100*	*4*
Manistee	4	75	8	0	0	100	6	75	7	100	8	0	0	0	0	100	4	50	5	25	9	100	1	100	2	50	5	100	4
NORTH-EASTERN DIV.†	*4*	*75*	*3*	*0*	*0*	*75*	*2*	*0*	*0*	*25*	*4*	*0*	*0*	*0*	*0*	*50*	*4*	*0*	*0*	*0*	*0*	*50*	*4*	*25*	*4*	*0*	*0*	*0*	*0*
Alpena	4	75	3	0	0	75	2	0	0	25	4	0	0	0	0	50	4	0	0	0	0	50	4	25	4	0	0	0	0
WESTERN DIVISION†	*20*	*100*	*7*	*25*	*14*	*58*	*9*	*100*	*9*	*100*	*10*	*0*	*0*	*100*	*8*	*65*	*4*	*63*	*4*	*25*	*4*	*100*	*2*	*100*	*2*	*100*	*4*	*75*	*5*
Grand Haven	4	----	----	----	----	100	4	----	----	----	----	----	----	----	----	100	3	75	3	----	----	100	2	100	3	----	----	----	----
Grand Rapids	4	100	6	0	0	80	7	0	0	100	5	0	0	100	6	50	6	25	6	0	0	100	2	100	1	0	0	50	8
Holland	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	3	50	2	25	4	100	3	100	2	0	0	0	0
Ludington	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	2	0	0	0	0	100	1	100	2	0	0	75	3
Muskegon	4	100	8	100	14	25	15	100	9	100	15	0	0	100	10	100	6	100	5	0	0	100	2	100	1	100	4	100	4
CENTRAL DIVISION†	*36*	*71*	*4*	*0*	*0*	*50*	*5*	*33*	*5*	*100*	*6*	*0*	*0*	*88*	*2*	*81*	*3*	*61*	*5*	*31*	*5*	*97*	*2*	*94*	*3*	*0*	*0*	*55*	*4*
DeWitt	4	100	3	0	0	0	0	0	0	100	4	0	0	100	1	100	2	50	4	25	4	100	2	100	3	0	0	0	0
Elsie	4	25	5	0	0	25	4	0	0	0	0	0	0	100	2	75	3	0	0	0	0	75	2	100	3	0	0	50	5
Hastings	4	0	0	0	0	0	0	50	3	100	3	0	0	0	0	100	3	75	4	50	5	100	1	0	0	0	0	0	0
Howell	4	100	5	0	0	0	0	0	0	100	5	0	0	0	0	25	4	0	0	0	0	100	1	100	2	0	0	100	3
Hubbardston	4	50	6	0	0	75	7	25	7	100	8	0	0	0	0	100	4	25	11	0	0	100	2	75	4	0	0	50	4
Ionia	4	0	0	0	0	0	0	25	5	100	5	0	0	0	0	100	3	50	4	0	0	100	1	100	2	0	0	0	0
North Lansing	4	75	5	0	0	0	0	0	0	100	4	0	0	100	1	100	4	100	4	25	5	100	2	100	4	0	0	0	0
Otisville	4	100	3	0	0	50	5	0	0	100	4	0	0	50	5	100	2	75	4	25	6	100	1	75	5	0	0	25	6
Ovid	4	50	2	0	0	50	5	0	0	0	0	0	0	0	0	25	4	50	4	0	0	0	0	100	2	0	0	50	2
NORTHERN-CENTRAL DIV.†	*4*	*25*	*2*	*0*	*0*	*25*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*50*	*2*	*25*	*2*	*50*	*3*	*0*	*0*	*100*	*1*	*50*	*2*	*25*	*2*	*75*	*3*
Big Rapids—*I. W. B.*	4	25	2	0	0	25	3	0	0	0	0	0	0	50	2	25	2	50	3	0	0	100	1	50	2	25	2	75	3
BAY AND EASTERN DIV.†	*36*	*96*	*4*	*0*	*0*	*75*	*7*	*68*	*7*	*100*	*7*	*75*	*10*	*69*	*6*	*86*	*3*	*81*	*5*	*63*	*6*	*100*	*1*	*96*	*4*	*25*	*9*	*83*	*5*
Bay City—W. H. B.	4	75	2	0	0	100	7	75	8	100	8	0	0	0	0	100	5	25	8	0	0	100	1	100	3	0	0	100	9
Bay City—W. R. M.	4	100	6	0	0	100	5	100	5	100	5	0	0	0	0	100	2	100	3	0	0	100	1	100	5	0	0	0	0
Lapeer—A. N.	4	0	0	0	0	100	8	100	7	100	10	0	0	50	8	100	1	100	7	0	0	100	2	100	8	0	0	100	5
Port Huron—*S. W. S.*	4	100	6	0	0	0	0	50	6	100	10	0	0	0	0	100	5	100	5	100	9	100	1	100	3	0	0	0	0
Port Sanilac	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	50	2	----	----	25	1	100	1	----	----	----	----	25	8
Saginaw City—N. D. L.	4	100	3	0	0	50	5	25	7	100	4	0	0	100	5	100	4	100	5	25	7	100	1	75	3	0	0	75	4
Saginaw City—*I. N. S.*	4	100	5	0	0	75	7	75	8	100	5	75	10	100	9	100	3	100	6	100	6	100	1	100	5	25	9	100	5
Thornville	4	100	4	0	0	25	7	50	5	0	0	0	0	0	0	100	2	100	4	0	0	100	2	0	0	0	0	100	4
West Bay City	4	0	0	0	0	0	0	0	0	0	0	0	0	25	2	25	3	25	2	0	0	100	1	100	2	0	0	0	0

SOUTH-WESTERN DIV.†	*29*	*83*	*4*	*25*	*11*	*40*	*4*	*42*	*5*	*95*	*5*	*25*	*3*	*40*	*4*	*76*	*3*	*68*	*4*	*25*	*8*	*97*	*2*	*100*	*2*	*0*	*0*	*67*	*4*
Allegan	4	75	5	0	0	25	6	75	7	100	6	0	0	25	8	100	4	75	7	0	0	100	1	100	3	0	0	25	8
Dowagiac—*C. W. M.*	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	75	3	----	----	----	----	100	1	----	----	----	----	----	----
Mattawan	3	0	0	0	0	67	4	0	0	100	5	0	0	33	2	67	3	33	4	0	0	67	3	100	3	0	0	67	1
Niles—*O. P. H.*	4	100	3	----	----	50	3	----	----	75	3	----	----	75	3	50	3	0	0	0	0	100	1	0	0	----	----	100	3
Niles—J. S. R.	4	75	7	25	11	----	----	25	7	100	6	----	----	----	----	75	7	100	5	25	8	100	2	100	1	----	----	75	4
Otsego	4	0	0	0	0	0	0	0	0	0	0	25	3	0	0	75	1	50	3	0	0	100	2	100	3	0	0	0	0
Paw Paw	2	100	3	0	0	0	0	0	0	100	4	0	0	0	0	50	3	0	0	0	0	100	2	100	2	0	0	0	0
St. Joseph	4	75	1	0	0	25	2	25	2	100	3	0	0	25	4	100	2	75	2	0	0	100	2	100	2	0	0	0	0
SOUTHERN-CENTRAL DIV.†	*66*	*82*	*4*	*25*	*3*	*50*	*6*	*52*	*5*	*82*	*6*	*25*	*6*	*100*	*6*	*85*	*4*	*55*	*5*	*100*	*10*	*100*	*2*	*97*	*2*	*69*	*8*	*72*	*5*
Adrian	4	100	3	0	0	50	4	25	4	100	4	0	0	0	0	75	3	25	5	0	0	100	1	0	0	75	4	50	4
Albion	4	100	6	0	0	25	12	75	7	100	5	0	0	0	0	100	5	100	6	100	9	100	2	100	3	75	13	0	0
Ann Arbor—*J. K.*	4	----	----	----	----	50	4	75	4	50	7	----	----	----	----	50	6	25	7	----	----	100	2	100	3	----	----	----	----
Battle Creek	4	----	----	----	----	100	5	75	6	25	6	----	----	----	----	100	3	100	4	----	----	100	3	100	1	----	----	100	7
Brooklyn	4	0	0	0	0	25	4	0	0	0	0	0	0	0	0	75	2	0	0	0	0	100	1	75	2	----	----	75	4
Clinton	4	0	0	0	0	25	9	50	8	100	11	0	0	0	0	100	5	75	7	100	10	100	2	100	4	75	10	100	9
Coldwater	4	100	3	0	0	25	4	25	3	25	7	0	0	0	0	100	3	75	5	0	0	100	2	100	1	0	0	0	0
Hillsdale	3	33	7	0	0	0	0	33	6	0	0	0	0	0	0	33	5	0	0	0	0	100	2	100	1	0	0	67	3
Jackson—W. W.	4	50	2	0	0	0	0	0	0	100	5	0	0	0	0	100	3	0	0	0	0	100	2	100	1	0	0	75	5
Jackson (State Prison)	4	75	1	25	1	----	----	----	----	100	4	----	----	----	----	100	4	----	----	----	----	100	3	----	----	----	----	----	----
Kalamazoo	4	0	0	0	0	0	0	0	0	100	7	0	0	100	6	75	4	50	6	0	0	100	1	100	2	0	0	100	5
Marshall	3	100	4	0	0	0	0	67	5	33	6	0	0	0	0	67	6	0	0	0	0	100	1	100	2	0	0	0	0
Mendon—H. C. C.	4	75	4	25	4	0	0	25	5	100	6	0	0	0	0	75	3	25	5	0	0	100	1	100	2	0	0	0	0
Mendon—E. S.	4	75	4	0	0	75	3	0	0	100	4	0	0	0	0	100	3	0	0	0	0	100	2	100	2	50	4	50	5
Sturgis	4	0	0	0	0	75	4	25	5	100	5	25	6	0	0	100	3	50	3	0	0	100	3	100	2	0	0	50	6
Three Rivers	4	100	5	0	0	50	10	100	6	100	9	0	0	0	0	100	3	0	0	0	0	100	1	100	3	0	0	0	0
Ypsilanti	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	3	0	0	100	2	75	2	0	0	50	2
SOUTH EASTERN DIV.†	*34*	*100*	*5*	*0*	*0*	*75*	*6*	*52*	*7*	*100*	*6*	*0*	*0*	*25*	*7*	*82*	*4*	*81*	*6*	*100*	*13*	*97*	*2*	*93*	*3*	*50*	*9*	*83*	*6*
Detroit—L. C.	3	100	2	0	0	0	0	0	0	100	4	0	0	0	0	100	5	100	12	100	12	100	2	100	8	0	0	100	11
Detroit—*E. L.*	4	100	12	0	0	100	8	100	14	100	13	0	0	0	0	100	7	100	9	0	0	100	2	100	1	25	14	100	9
Detroit—W. H. R.	4	100	5	0	0	100	10	100	11	100	7	0	0	0	0	100	4	75	10	100	13	100	2	100	1	100	11	0	0
Milford	4	100	6	----	----	100	4	----	----	----	----	----	----	----	----	100	2	100	3	----	----	100	1	----	----	----	----	100	6
Utica—G. G. R.	4	0	0	0	0	0	0	25	5	100	8	0	0	0	0	50	4	50	4	0	0	100	1	100	2	0	0	75	4
Walled Lake	3	0	0	0	0	0	0	33	3	100	4	0	0	0	0	67	3	0	0	0	0	100	1	67	4	0	0	67	3
Washington	4	100	2	0	0	0	0	25	4	100	4	0	0	0	0	100	1	100	3	0	0	75	3	75	2	0	0	100	5
Wyandotte—E. P. C.	4	0	0	0	0	50	4	25	4	100	5	0	0	0	0	100	3	50	4	----	----	100	1	100	2	25	4	25	4
Wyandotte—*T. J. L.*	4	0	0	0	0	25	5	0	0	100	6	0	0	25	7	25	7	0	0	0	0	100	1	100	2	50	8	100	4

* For names of observers, see Exhibit 31, pages 420–1; for comments on the table, see pages 399, 403, 421.
† For counties in each division see Exhibit 1, page 153. The numbers on this line are an average for the division.
‡, §, ||. For these references, see foot-notes on page 449.

TABLE 3.—*Diseases, by Localities in Michigan, Four Weeks ending* **September** *28, 1878*—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Influenza. Per ct. of Weeks Present.†	Influenza. Av. Ord. of Prev. when Present.§	Measles. Per ct. of Weeks Present.†	Measles. Av. Ord. of Prev. when Present.§	Neuralgia.¶ Per ct. of Weeks Present.†	Neuralgia.¶ Av. Ord. of Prev. when Present.§	Pneumonia. Per ct. of Weeks Present.†	Pneumonia. Av. Ord. of Prev. when Present.§	Puerperal Fever. Per ct. of Weeks Present.†	Puerperal Fever. Av. Ord. of Prev. when Present.§	Rheumatism. Per ct. of Weeks Present.†	Rheumatism. Av. Ord. of Prev. when Present.§	Scarlatina. Per ct. of Weeks Present.†	Scarlatina. Av. Ord. of Prev. when Present.§	Smallpox. Per ct. of Weeks Present.†	Smallpox. Av. Ord. of Prev. when Present.§	Tonsilitis.¶ Per ct. of Weeks Present.†	Tonsilitis.¶ Av. Ord. of Prev. when Present.§	Whooping-cough. Per ct. of Weeks Present.†	Whooping-cough. Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	244	75	4.0	86	6.5	60	7.3	71	6.8	58	8.7	81	5.1	70	5.9	25	2.0	63	5.0	82	4.9
UPPER-PENINSULAR DIV.†	*11*	*63*	*5*	----	----	----	----	*25*	*7*	----	----	*100*	*6*	*100*	*4*	----	----	----	----	----	----
Calumet	4	25	6	----	----	----	----	25	7	----	----	100	4	100	3	----	----	----	----	----	----
Houghton *a*	4	100	3	----	----	----	----	----	----	----	----	100	8	100	4	----	----	----	----	----	----
Ishpeming	3	0	0	0	0	----	----	0	0	0	0	100	5	0	0	0	0	----	----	0	0
NORTH-WESTERN DIV.†	*4*	*0*	*0*	*0*	*0*	----	----	*0*	*0*	*0*	*0*	*50*	*9*	*0*	*0*	*0*	*0*	----	----	*0*	*0*
Manistee	4	0	0	0	0	----	----	0	0	0	0	50	9	0	0	0	0	----	----	0	0
NORTH-EASTERN DIV.†	*4*	*75*	*2*	*75*	*3*	----	----	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*75*	*4*	*100*	*2*
Alpena *b*	4	75	2	75	3	----	----	0	0	0	0	0	0	0	0	0	0	75	4	100	2
WESTERN DIVISION†	*20*	*83*	*5*	*0*	*0*	----	----	*75*	*9*	*100*	*7*	*81*	*6*	*63*	*8*	*0*	*0*	----	----	*88*	*5*
Grand Haven	4	----	----	----	----	----	----	----	----	----	----	25	5	----	----	----	----	----	----	75	6
Grand Rapids	4	100	4	0	0	----	----	0	0	100	7	100	8	0	0	0	0	----	----	100	4
Holland *c*	4	50	5	0	0	----	----	100	4	0	0	100	4	0	0	0	0	----	----	0	0
Ludington	4	0	0	0	0	----	----	0	0	0	0	0	0	25	3	0	0	----	----	0	0
Muskegon	4	100	7	0	0	----	----	50	13	0	0	100	11	100	12	----	----	----	----	----	----
CENTRAL DIVISION†	*36*	*63*	*3*	*0*	*0*	----	----	*23*	*7*	*50*	*7*	*70*	*5*	*63*	*6*	*25*	*2*	----	----	*75*	*5*
DeWitt *d*	4	0	0	0	0	----	----	0	0	0	0	75	3	0	0	0	0	----	----	0	0
Elsie	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Hastings	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Howell	4	0	0	0	0	----	----	0	0	50	7	100	6	0	0	0	0	----	----	25	7
Hubbardston *e*	4	100	1	0	0	----	----	25	9	0	0	50	7	0	0	0	0	----	----	0	0
Ionia	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
North Lansing	4	0	0	0	0	----	----	25	5	0	0	25	5	0	0	0	0	----	----	0	0
Otisville	4	0	0	0	0	----	----	50	6	0	0	100	4	50	6	0	0	----	----	100	4
Ovid	4	25	4	0	0	----	----	0	0	0	0	0	0	75	5	25	2	----	----	100	5
NORTH'N-CENTRAL DIV.†	*4*	*0*	*0*	*0*	*0*	----	----	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	----	----	*0*	*0*
Big Rapids—*I. W. B.* *f*	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
BAY AND EASTERN DIV.†	*36*	*100*	*5*	*0*	*0*	*75*	*6*	*100*	*5*	*0*	*0*	*88*	*5*	*75*	*6*	*0*	*0*	----	----	*100*	*3*
Bay City—W. H. B.	4	100	6	0	0	----	----	0	0	0	0	100	6	75	6	0	0	----	----	0	0
Bay City—W. R. M. *g*	4	100	6	0	0	----	----	0	0	0	0	100	7	75	6	0	0	----	----	0	0
Lapeer—A. N.	4	100	3	0	0	----	----	100	8	0	0	100	7	0	0	0	0	----	----	0	0
Port Huron—*S. W. S.*	4	100	7	0	0	75	6	0	0	0	0	100	8	0	0	0	0	----	----	100	2
Port Sanilac *h*	----	----	----	----	----	----	----	----	----	----	----	50	2	----	----	----	----	----	----	----	----
Saginaw City—N. D. L. *i*	4	0	0	0	0	----	----	100	4	0	0	100	3	50	7	0	0	----	----	0	0
Saginaw City—*I. N. S.*	4	100	9	0	0	----	----	100	7	0	0	100	3	75	9	0	0	----	----	0	0
Thornville	4	100	1	0	0	----	----	0	0	0	0	50	7	0	0	0	0	----	----	100	3
West Bay City	4	0	0	0	0	----	----	100	2	0	0	0	0	100	2	0	0	----	----	0	0
SOUTH-WESTERN DIV.†	*29*	*75*	*3*	*0*	*0*	*25*	*12*	*0*	*0*	*0*	*0*	*76*	*4*	*50*	*4*	*0*	*0*	*100*	*10*	*75*	*5*
Allegan	4	0	0	0	0	----	----	0	0	0	0	50	5	0	0	0	0	----	----	75	5
Dowagiac—*C. W. M.* *j*	4	75	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Present.†	Av. Order of Prevalence when Present.§
a Pleuritis. The diarrhea report'd Sept. 28 is marked catarrhal. Influenza in epidemic form quite severe, Sept. 28.	25	9
b Puerperal convulsions	25	5
c Bilious remittent fever	50	1
c Bilious fever	25	4
c Nervous fever	100	4
d Anemia	50	4
d Hematuria	50	4
d Synovitis	75	4
e Sore throat	25	4
f Spasmodic croup	25	4
g Not much change, 3 weeks ending Sept. 21. Scarlet fever light, none fatal, Sept. 21. Scarlet fever very light and only few cases, Sept. 28. No epidemic of any kind, Sept. 28.		
h Some mild cases of sore throat, Sept. 7.		
i Some increase of sickness, week ending Sept. 7.		
j Nothing but intermittent fever to report, scarcely enough of that, week ending Sept. 28.		
k Amaurosis	33	6
k Bright's disease	33	6
k Cancer of stomach	33	5
k Acute mania	33	3
k Syphilis, primary	33	4
l Cancer	25	12
l Cystitis	25	9
l Gastro-duodenitis	75	9
l Gastritis	25	15
l Laryngitis	75	1[illegible]
l Pharyngitis	25	11

Mattawan ..... *k*	3	0	0	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0
Niles—*O. P. H.*	4	50	2	0	0	----	----	0	0	0	0	100	3	0	0	0	0	----	----	0	0
Niles—J. S. R. ..... *l*	4	75	7	----	----	25	12	----	----	----	----	100	6	----	----	----	----	100	10	----	----
Otsego ..... *m*	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Paw Paw ..... *n*	2	0	0	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0
St. Joseph	4	100	2	0	0	----	----	0	0	0	0	25	3	50	4	0	0	----	----	0	0
SOUTH'N-CENTRAL DIV.† ..	*66*	*67*	*4*	*0*	*0*	*71*	*6*	*55*	*6*	*25*	*12*	*76*	*5*	*63*	*5*	*0*	*0*	*45*	*4*	*75*	*5*
Adrian	4	0	0	0	0	----	----	0	0	0	0	50	4	100	3	0	0	----	----	25	5
Albion	4	100	3	0	0	----	----	100	8	0	0	100	7	100	12	0	0	----	----	50	11
Ann Arbor—*J. K.*	4	----	----	----	----	----	----	----	----	----	----	----	----	75	1	----	----	----	----	----	----
Battle Creek ..... *o*	4	----	----	----	----	----	----	----	----	----	----	----	----	25	4	----	----	----	----	----	----
Brooklyn	4	0	0	0	0	----	----	0	0	0	0	50	3	0	0	0	0	----	----	0	0
Clinton	4	100	4	0	0	----	----	0	0	25	12	100	6	0	0	0	0	----	----	100	1
Coldwater	4	0	0	0	0	----	----	0	0	0	0	100	5	0	0	0	0	25	3	75	5
Hillsdale ..... *p*	3	67	6	0	0	33	4	33	4	0	0	100	5	0	0	0	0	33	3	0	0
Jackson—W. W. ..... *q*	4	50	2	0	0	----	----	25	5	0	0	25	6	0	0	0	0	----	----	100	1
Jackson (State Prison) .. *r*	4	----	----	----	----	----	----	----	----	----	----	100	3	----	----	----	----	75	5	----	----
Kalamazoo	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	100	4
Marshall	3	33	4	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0
Mendon—H. C. C. ..... *s*	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Mendon—E. S. ..... *t*	4	0	0	0	0	----	----	0	0	0	0	75	5	0	0	0	0	----	----	0	0
Sturgis ..... *u*	4	25	1	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Three Rivers ..... *v*	4	100	4	0	0	100	7	0	0	0	0	100	7	50	8	0	0	----	----	0	0
Ypsilanti ..... *w*	4	50	4	0	0	----	----	0	0	0	0	25	3	25	3	0	0	----	----	0	0
SOUTH-EASTERN DIV.†	*34*	*64*	*4*	*100*	*10*	----	----	*100*	*9*	*0*	*0*	*93*	*5*	*73*	*8*	*0*	*0*	----	----	*84*	*6*
Detroit—L. C.	3	100	5	100	10	----	----	100	11	0	0	100	4	100	8	0	0	----	----	100	8
Detroit—*E. L.* ..... *x*	4	100	4	0	0	----	----	100	9	0	0	100	7	100	6	0	0	----	----	75	7
Detroit—W. H. R. ..... *y*	4	100	3	0	0	----	----	100	7	0	0	100	9	50	13	0	0	----	----	0	0
Milford	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100	7
Utica—G. G. R. ..... *z*	4	0	0	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0
Walled Lake	3	33	3	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Washington ..... *aa*	4	25	3	0	0	----	----	0	0	0	0	100	3	50	5	0	0	----	----	0	0
Wyandotte—E. P. C. ... *bb*	4	25	4	0	0	----	----	0	0	0	0	50	5	0	0	0	0	----	----	50	4
Wyandotte—*T. J. L.*	4	0	0	0	0	----	----	0	0	0	0	100	3	0	0	0	0	----	----	100	6

m	From tubercular meningitis, membrane'ns croup, chronic rheumatism, one death each, week ending Sept. 28.		
n	Bilious colic	50	4
	Cancer of stomach, dyspepsia, gonorrhea, and peri-typhlitis, each	100	4
	Spermatorrhea	50	4
	Spinal irritation	50	4
	Typhoid pneumonia	25	7
o	See note *o* for Sept., below.		
p	Intermittents are prevailing to some extent, but mild, w'k ending Sept. 14.		
q	Ten or twelve cases of diphtheria in the vicinity.		
r	Syphilis	100	5
s	Cancer	25	6
	Chronic hepatitis	100	5
t	Diabetes mel.	100	5
	Gall stone obstruction of duct and duodenum	25	....
u	The influenza of Sept. 21 was cholera of a mild type.		
v	Functional derangement of the liver	100	2
	Continues healthy for this season of the year, 4 w'ks ending Sept. 28.		
w	See note *w* for Sept., below.		
x	Parotiditis	75	15
	One case of yellow fever, patient from Memphis, fatal.		
y	See note *y* for Sept., below.		
z	Dyspepsia	25	4
aa	Acute dyspepsia	25	3
	Congestion of brain	75	4
	Brain fever	25	3
	Enlarged prostate	75	4
	Urethral spasms	25	5
	Goitre	75	4
bb	Malarial exanthems	75	3

* For names of observers, see Exhibit 31, pages 420–1.

† For counties in each division, see Exhibit 1, page 153. The numbers on this line are an average for the division.

‡, §, ‖, ¶. For these references, see foot-notes on page 449; for comments on the table, see pages 399, 403, 421.

a, *b*, *c*, etc. These letters refer across the page, from the names of observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on postal blanks.

o No particular change; some more dysentery; all easily controlled.—Sept. 7. No particular change; one death from puerperal-peritonitis.—Sept. 14. Fevers are a little more obstinate, some gastro-enteritic tendency.—Sept. 27.

w A curious sort of fever prevails here, ushered in by a chill followed by high fever, pulse from 100 to 120, temperature up to 104° and 108° F.; intense headache and pain of back and limbs. This lasts for four or five days, then a marked intermission assuming a quotidian form. During this febrile condition, anti-periodics are more injury than good; in the intermittent stage large doses of quinine are borne and are required. Excessive debility accompanies convalescence. Within a few days, scarlatina has attacked five children, who are entirely isolated from any infection or contagion. No origin can be assigned for it.—Sept. 28.

y Very healthy, four weeks ending Sept. 30. Some throat trouble but not much; I have not been able to learn authoritatively that there is any scarlatina, but hear rumors.—Sept. 7. Some increase of influenza towards close of week ending Sept. 21. Little change since last report, unless not so many cases.—Sept. 28.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Five Weeks ending* **November** *2, 1878.*

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric).		Fever, Typho-Malarial.	
		Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.†	Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	293	76	3.7	36	5.6	37	5.9	58	6.7	93	5.4	36	6.9	58	5.6	73	4.6	56	6.4	60	6.9	93	1.7	87	2.5	60	6.1	68	4.6
UPPER-PENIN. DIVISION†..	*12*	*83*	*3*	*80*	*5*	*25*	*5*	*50*	*6*	*100*	*5*	*38*	*6*	*0*	*0*	*83*	*4*	*100*	*6*	*78*	*6*	*50*	*6*	*100*	*1*	*58*	*5*	*0*	*0*
Calumet	4	100	4	----	----	25	5	50	6	----	----	----	----	----	----	100	3	100	6	100	5	50	6	100	1	25	6	----	----
Houghton	5	100	3	80	5	0	0	0	0	100	5	20	5	0	0	100	4	0	0	60	6	0	0	0	0	100	3	0	0
Ishpeming	3	33	1	0	0	0	0	0	0	100	4	67	6	0	0	33	4	0	0	0	0	0	0	0	0	33	5	0	0
NORTH-WESTERN DIV.†	*5*	*80*	*4*	*0*	*0*	*20*	*6*	*0*	*0*	*100*	*8*	*0*	*0*	*0*	*0*	*60*	*5*	*0*	*0*	*0*	*0*	*100*	*1*	*100*	*2*	*80*	*4*	*60*	*4*
Manistee	5	80	4	0	0	20	6	0	0	100	8	0	0	0	0	60	5	0	0	0	0	100	1	100	2	80	4	60	4
NORTH-EASTERN DIV.†	*5*	*80*	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*20*	*4*	*20*	*6*	*20*	*4*	*20*	*6*	*0*	*0*	*40*	*7*	*60*	*5*	*0*	*0*	*0*	*0*	*0*	*0*
Alpena	5	80	4	0	0	0	0	0	0	20	4	20	6	20	4	20	6	0	0	40	7	60	5	0	0	0	0	0	0
WESTERN DIVISION	*24*	*60*	*6*	*0*	*0*	*40*	*9*	*60*	*7*	*100*	*8*	*0*	*0*	*71*	*6*	*74*	*5*	*73*	*5*	*78*	*9*	*83*	*2*	*100*	*1*	*78*	*5*	*58*	*5*
Grand Haven	5	40	5	0	0	40	4	20	5	0	0	0	0	0	0	80	3	80	2	0	0	40	2	100	1	0	0	40	4
Grand Rapids	5	40	7	0	0	0	0	0	0	100	4	0	0	80	6	80	7	60	7	----	----	100	3	100	1	0	0	60	8
Holland	4	0	0	0	0	0	0	0	0	0	0	0	0	25	3	25	3	0	0	50	3	75	2	100	1	75	3	25	3
Ludington	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	60	3
Muskegon	5	100	7	----	----	40	14	100	9	100	12	----	----	100	10	100	7	80	6	100	15	100	2	100	1	80	7	100	5
CENTRAL DIVISION	*48*	*67*	*4*	*0*	*0*	*57*	*7*	*50*	*11*	*93*	*5*	*40*	*4*	*75*	*4*	*85*	*3*	*46*	*5*	*26*	*5*	*90*	*2*	*84*	*3*	*89*	*7*	*61*	*4*
Charlotte	4	100	3	0	0	100	7	50	11	100	13	0	0	100	11	100	3	25	9	0	0	100	3	100	6	100	9	100	8
DeWitt	5	100	3	0	0	0	0	0	0	100	4	0	0	100	2	100	1	60	4	20	5	100	2	100	3	80	5	0	0
Elsie	5	40	5	0	0	40	4	0	0	0	0	0	0	20	2	0	0	0	0	0	0	80	3	20	2	0	0	100	1
Hastings	4	0	0	0	0	0	0	0	0	100	2	0	0	0	0	100	3	50	4	0	0	100	1	0	0	0	0	25	3
Howell	5	100	5	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	25	5	100	1	100	2	0	0	80	3
Hubbardston	5	40	8	0	0	40	10	0	0	100	7	0	0	0	0	100	4	40	6	0	0	100	1	100	2	----	----	40	3
Ionia	5	0	0	0	0	0	0	0	0	100	4	0	0	0	0	40	3	0	0	0	0	100	1	100	2	0	0	40	5
North Lansing	5	40	5	0	0	0	0	0	0	100	2	40	4	100	1	60	5	60	3	20	3	100	2	80	3	0	0	0	0
Otisville	5	100	2	0	0	0	0	0	0	100	3	0	0	60	4	100	3	0	0	40	6	100	1	60	3	0	0	40	5
Ovid	5	20	1	0	0	0	0	0	0	40	4	0	0	0	0	0	0	40	4	0	0	20	4	100	2	0	0	0	0
NORTHERN-CENTRAL DIV.†	*5*	*60*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*40*	*2*	*0*	*0*	*40*	*3*	*40*	*4*	*100*	*1*	*20*	*2*	*20*	*4*	*20*	*2*
Big Rapids—*I. W. B.*	5	60	3	0	0	0	0	0	0	0	0	0	0	40	2	0	0	40	3	40	4	100	1	20	2	20	4	20	2
BAY AND EASTERN DIV.†..	*43*	*81*	*3*	*0*	*0*	*22*	*7*	*25*	*7*	*100*	*7*	*44*	*8*	*61*	*7*	*66*	*4*	*56*	*7*	*71*	*8*	*95*	*1*	*88*	*4*	*50*	*7*	*70*	*5*
Bay City—W. H. B.	5	100	3	0	0	20	12	0	0	100	8	0	0	100	11	100	10	0	0	60	12	100	1	100	5	0	0	100	10
Bay City—W. R. M.	4	100	4	0	0	25	5	0	0	100	5	0	0	25	6	50	3	50	5	0	0	100	1	100	5	0	0	25	5
Lapeer—A. N.	5	20	9	0	0	0	0	0	0	100	10	0	0	80	6	100	2	60	8	0	0	100	1	100	6	0	0	100	5
Port Huron—*S. W. S.*	5	100	3	0	0	0	0	0	0	100	10	40	9	80	4	20	5	0	0	100	9	100	3	100	6	0	0	0	0
Port Sanilac	5	20	1	0	0	0	0	0	0	0	0	0	0	0	0	40	2	0	0	0	0	60	1	20	1	0	0	40	3
Saginaw City—N. D. L.	5	100	3	0	0	0	0	0	0	100	4	0	0	0	0	80	5	0	0	80	5	100	1	0	0	0	0	0	0
Saginaw City—*I. N. S.*	4	100	2	0	0	25	7	25	7	100	3	75	7	25	9	100	5	100	8	100	5	100	1	100	4	50	7	75	5
Thornville	5	100	3	0	0	0	0	0	0	0	0	20	7	0	0	40	3	20	7	20	7	100	1	0	0	0	0	100	5

West Bay City	5	100	3	0	0	20	2	0	0	0	0	0	0	40	3	0	0	0	0	0	0	100		100	2	0	0	40	3
SOUTH-WESTERN DIV.†	*34*	*65*	*5*	*20*	*8*	*25*	*1*	*20*	*4*	*86*	*4*	*0*	*0*	*80*	*6*	*100*	*8*	*60*	*7*	*53*	*5*	*88*	*1*	*88*	*2*	*60*	*9*	*79*	*3*
Allegan	5	60	3	0	0	0	0	0	0	100	5	0	0	80	6	0	0	0	0	0	0	100		100	4	40	8	0	0
Dowagiac—*C. W. M.*	5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100		----	----	----	----	----	----
Mattawan	4	0	0	0	0	25	1	0	0	75	4	0	0	0	0	0	0	0	0	0	0	25	2	75	2	0	0	75	2
Niles—*O. P. H.*	5	100	4	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	60	3	100	1	0	0	0	0	100	3
Niles—J. S. R.	5	80	8	20	8	0	0	0	0	100	7	0	0	0	0	100	8	60	7	80	10	100	2	100	1	80	10	100	3
Otsego	5	20	3	0	0	0	0	20	4	40	3	0	0	0	0	0	0	0	0	20	3	100		60	2	0	0	0	0
St. Joseph	5	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0	0	0	0	0	80		100	1	0	0	40	2
SOUTHERN-CENTRAL DIV.†	*72*	*81*	*3*	*27*	*5*	*30*	*3*	*80*	*7*	*94*	*5*	*33*	*8*	*60*	*5*	*56*	*5*	*37*	*8*	*58*	*6*	*99*	*2*	*87*	*2*	*40*	*7*	*73*	*5*
Adrian	5	100	2	0	0	20	3	60	4	80	3	0	0	0	0	60	3	0	0	0	0	100	1	60	3	60	4	100	3
Albion	5	100	4	0	0	0	0	0	0	100	6	0	0	40	11	60	7	60	9	100	9	100	2	100	3	0	0	20	12
Brooklyn	5	40	3	----	----	----	----	----	----	----	----	----	----	100	2	----	----	40	5	----	----	100	2	40	3	----	----	----	----
Clinton	5	0	0	40	8	0	0	0	0	100	7	0	0	40	6	0	0	20	7	80	6	100	2	100	3	20	9	100	6
Coldwater	5	100	4	0	0	0	0	0	0	100	7	0	0	0	0	20	5	0	0	0	0	100	1	100	3	0	0	80	6
Hillsdale	4	25	5	0	0	0	0	0	0	75	6	0	0	0	0	25	5	25	5	25	5	100	2	100	2	0	0	100	5
Jackson—W. W.	5	40	2	0	0	0	0	0	0	100	4	0	0	60	3	0	0	0	0	20	5	80	1	100	2	0	0	60	4
Jackson (State Prison)	5	100	1	20	1	----	----	----	----	100	4	----	----	----	----	----	----	----	----	----	----	100	4	----	----	----	----	----	----
Kalamazoo	5	0	0	0	0	0	0	0	0	100	6	20	8	100	5	0	0	0	0	0	0	100	1	100	2	0	0	100	4
Marshall	3	100	3	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100		100	2	0	0	0	0
Mendon—H. C. C.	5	100	3	0	0	0	0	0	0	100	4	0	0	0	0	40	4	0	0	0	0	100	1	100	2	0	0	40	6
Mendon—E. S.	5	80	3	0	0	40	3	0	0	60	4	0	0	0	0	80	3	0	0	0	0	100	2	100	1	0	0	100	4
Sturgis	5	0	0	20	6	0	0	0	0	100	5	40	6	0	0	60	3	0	0	0	0	100		100	2	0	0	0	0
Three Rivers	5	100	5	0	0	0	0	100	9	100	10	40	11	0	0	100	6	0	0	0	0	100	1	100	2	0	0	0	0
Ypsilanti *y*	5	0	0	0	0	0	0	0	0	0	0	0	0	20	2	0	0	0	0	0	0	100	1	20	2	0	0	40	3
SOUTH-EASTERN DIV.†	*45*	*83*	*4*	*0*	*0*	*60*	*6*	*67*	*6*	*95*	*5*	*0*	*0*	*36*	*7*	*89*	*6*	*67*	*9*	*80*	*10*	*98*	*2*	*90*	*3*	*56*	*6*	*73*	*5*
Detroit—L. C.	5	100	2	0	0	0	0	0	0	100	4	0	0	20	6	100	11	100	15	100	12	100		100	6	0	0	100	9
Detroit—*E. L.*	5	100	7	0	0	0	0	0	0	100	8	0	0	100	11	100	12	100	13	80	13	100	2	100	1	60	13	100	11
Detroit—W. H. R.	5	100	4	0	0	0	0	80	11	100	7	0	0	20	12	100	6	60	12	100	11	100	2	100	1	100	8	0	0
Milford	5	100	3	0	0	20	6	0	0	0	0	0	0	20	4	60	4	60	5	40	5	100	2	0	0	0	0	40	5
Northville	5	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	3	80	2	20	3	100	1
Utica—G. G. R.	5	----	----	----	----	100	5	40	6	100	6	0	0	0	0	100	5	0	0	0	0	100	1	100	2	0	0	80	4
Washington	5	100	2	0	0	0	0	0	0	100	3	----	----	20	4	100	3	40	4	0	0	80	3	60	4	0	0	60	4
Wyandotte—E. P. C.	5	40	3	0	0	0	0	80	2	60	4	0	0	0	0	60	3	40	3	0	0	100		80	2	40	3	40	3
Wyandotte—*T. J. L.*	5	40	4	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100		100	2	60	4	60	3

* For names of observers, see Exhibit 31, pages 420–1; for comments on the table, see pages 399, 403, 421.
† For counties in each division, see Exhibit 1, page 153. The numbers on this line are an average for the division.
‡, §, ||. For these references, see foot-notes on page 449.
y The entire absence of bowel complaints this year in this section of the State has been a subject of remark. Never did I know a more reckless use of green vegetables and fruit, yet the usual diarrheas incidental to warm weather and the use of fresh vegetables and fruit have not been produced. But one case of summer complaint in children has occurred in my practice, and but one of cholera morbus. Dysentery, a prevalent disease here, has not been heard of.—Oct. 5. [In reply to the question, Dr. Ratwell stated, Oct 19, that he could not give the reason of this freedom from bowel complaints. It may, perhaps, be in part explained by the fact, stated in a communication from Dr. B. on page xxxv. of the Annual Report for 1878, that the bed of the Huron River, which flows through Ypsilanti, was not allowed to become dry in the Summer of 1878, as it was in 1877.—H. B. B., Sec.] Scarlatina of a mild form is prevalent, though not as an epidemic; cases of diphtheria of a very tractable character prevail.—Oct. 12. Scarlatina is prevalent here; all seems to be sporadic, and not propagated by contagion, occurring in isolated parts of the city and not amongst children attending school.—Oct. 19. Scarlatina mild in its course, but severe in its sequela prevails.—Oct. 26.

TABLE 3.—*Diseases, by Localities in Michigan, Five Weeks ending* **November 2, 1878**—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Influenza. Per ct. of Weeks Present.††	Influenza. Av. Ord. of Prev. when Present.§	Measles. Per ct. of Weeks Present.††	Measles. Av. Ord. of Prev. when Present.§	Neuralgia.¶ Per ct. of Weeks Present.††	Neuralgia.¶ Av. Ord. of Prev. when Present.§	Pneumonia. Per ct. of Weeks Present.††	Pneumonia. Av. Ord. of Prev. when Present.§	Puerperal Fever. Per ct. of Weeks Present.††	Puerperal Fever. Av. Ord. of Prev. when Present.§	Rheumatism. Per ct. of Weeks Present.††	Rheumatism. Av. Ord. of Prev. when Present.§	Scarlatina. Per ct. of Weeks Present.††	Scarlatina. Av. Ord. of Prev. when Present.§	Smallpox. Per ct. of Weeks Present.††	Smallpox. Av. Ord. of Prev. when Present.§	Tonsilitis.¶ Per ct. of Weeks Present.††	Tonsilitis.¶ Av. Ord. of Prev. when Present.§	Whooping-cough. Per ct. of Weeks Present.††	Whooping-cough. Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	293	71	3.1	100	7.0	66	5.7	57	6.3	53	7.7	80	4.5	63	6.0	0	0	54	5.7	71	4.7
UPPER-PENINSULAR DIV.†	*12*	*88*	*1*	*0*	*0*	*88*	*5*	*78*	*6*	*0*	*0*	*67*	*4*	*75*	*4*	*0*	*0*	*67*	*3*	*25*	*6*
Calumet	4	----	----	----	----	----	----	50	6	----	----	100	4	100	2	----	----	----	----	25	6
Houghton *a*	5	100	1	0	0	100	6	100	5	0	0	20	6	80	5	0	0	0	0	0	0
Ishpeming *b*	3	67	1	0	0	67	4	0	0	0	0	100	2	33	4	0	0	67	3	0	0
NORTH-WESTERN DIV.†	*5*	*60*	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*7*	*0*	*0*	*0*	*0*	*80*	*9*	*80*	*7*
Manistee	5	60	5	0	0	0	0	0	0	0	0	100	7	0	0	0	0	80	9	80	7
NORTH-EASTERN DIV.†	*5*	*100*	*1*	*100*	*2*	----	----	*20*	*3*	*0*	*0*	*60*	*5*	*0*	*0*	*0*	*0*	*40*	*4*	*100*	*3*
Alpena	5	100	1	100	2	----	----	20	3	0	0	60	5	0	0	0	0	40	4	100	3
WESTERN DIVISION†	*24*	*74*	*4*	*0*	*0*	*80*	*6*	*70*	*10*	*60*	*5*	*63*	*6*	*47*	*9*	*0*	*0*	*20*	*7*	*90*	*6*
Grand Haven	5	40	6	0	0	0	0	40	6	0	0	80	6	20	7	0	0	20	5	80	8
Grand Rapids *c*	5	100	2	0	0	80	6	0	0	0	0	40	8	20	8	0	0	20	8	100	4
Holland *d*	4	50	3	0	0	----	----	0	0	0	0	75	3	----	----	----	----	----	----	----	----
Ludington *e*	5	0	0	0	0	0	0	0	0	0	0	20	3	0	0	0	0	0	0	0	0
Muskegon	5	100	5	----	----	----	----	100	14	60	15	100	8	100	11	----	----	----	----	----	----
CENTRAL DIVISION†	*48*	*68*	*3*	*0*	*0*	*20*	*3*	*53*	*7*	*50*	*4*	*83*	*5*	*52*	*4*	*0*	*0*	*60*	*3*	*73*	*4*
Charlotte	4	100	3	0	0	----	----	100	10	0	0	100	7	0	0	0	0	----	----	0	0
DeWitt *f*	5	0	0	0	0	20	3	0	0	40	5	80	4	0	0	0	0	60	3	0	0
Elsie *g*	5	----	----	----	----	----	----	----	----	----	----	----	----	40	3	----	----	----	----	----	----
Hastings	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Howell	5	0	0	0	0	----	----	80	8	0	0	80	4	60	7	0	0	----	----	100	5
Hubbardston *h*	5	100	3	0	0	----	----	0	0	0	0	100	6	0	0	0	0	----	----	0	0
Ionia	5	0	0	0	0	----	----	0	0	0	0	0	0	40	5	0	0	----	----	0	0
North Lansing	5	0	0	0	0	0	0	20	5	60	3	60	3	40	3	0	0	0	0	0	0
Otisville	5	20	2	0	0	----	----	20	6	0	0	80	5	0	0	0	0	----	----	20	4
Ovid	5	60	2	0	0	----	----	0	0	0	0	0	0	80	3	0	0	----	----	100	3
NORTH'N-CENTRAL DIV.†	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*20*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Big Rapids—*I. W. B.* *i*	5	0	0	0	0	0	0	20	3	0	0	0	0	0	0	0	0	0	0	0	0
BAY AND EASTERN DIV.†	*43*	*79*	*3*	*0*	*0*	*71*	*5*	*64*	*7*	*0*	*0*	*79*	*4*	*71*	*7*	*0*	*0*	*55*	*6*	*57*	*5*
Bay City—W. H. B.	5	100	2	0	0	100	7	60	12	0	0	100	5	100	5	0	0	40	10	0	0
Bay City—W. R. M. *j*	4	100	3	0	0	25	4	50	6	0	0	100	6	75	5	0	0	25	5	50	5
Lapeer—A. N.	5	100	3	0	0	20	5	100	8	0	0	100	5	60	10	0	0	20	3	0	0
Port Huron—*S. W. S.*	5	100	3	0	0	100	8	60	9	0	0	100	7	80	11	0	0	100	10	100	4
Port Sanilac	5	40	2	0	0	----	----	0	0	0	0	40	2	0	0	0	0	----	----	0	0
Saginaw City—N. D. L. *k*	5	0	0	0	0	100	3	0	0	0	0	80	4	0	0	0	0	60	3	0	0
Saginaw City—*I. N. S.*	4	100	6	0	0	----	----	75	7	0	0	100	3	75	7	0	0	----	----	0	0
Thornville	5	80	2	0	0	60	6	20	5	0	0	60	5	0	0	0	0	----	----	20	6
West Bay City *l*	5	20	2	0	0	80	1	80	2	0	0	40	3	40	2	0	0	80	2	0	0
SOUTH-WESTERN DIV.†	*34*	*63*	*3*	*0*	*0*	*100*	*12*	*22*	*3*	*0*	*0*	*76*	*4*	*33*	*4*	*0*	*0*	*53*	*5*	*100*	*5*
Allegan	5	0	0	0	0	----	----	0	0	0	0	100	3	40	7	0	0	----	----	100	5

	DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Present.†	Av. Order of Prevalence when Present.§
	Croup	20	5
	Inflammatory croup	40	5
	Catarrhal gastritis and enteritis	40	4
a	Catarrhal gastritis	20	5
a	Evidence of catarrhal inflammations and influenza quite severe, Oct. 5.		
a	Influenza still very prevalent and severe, Oct. 12.		
b	Senile gangrene	33	5
c	Very little sickness, week ending Oct. 26.		
d	Bilious fever	25	3
d	Bilious remittent fever	25	2
d	Nervous fever	100	3
e	Not much sickness, week ending Oct. 12.		
f	Anemia	40	4
f	Dropsy	20	5
f	Endo-metritis	20	4
f	Hematuria	100	5
f	Periostitis	80	5
g	Peritonitis	20	3
h	No new cases, week ending Oct. 12.		
h	Very little sickness, Oct. 26.		
i	Spasmodic croup	20	3
j	Catarrhal and Bronchial symptoms in excess, otherwise not much change, Oct. 5.		
j	Sporadic cases of scarlet fever; very healthy, Oct. 26.		
j	Not much change, Nov. 2.		
k	Some sore throat, Oct. 12.		
k	Very healthy, Nov. 2.		
l	Very healthy, Nov. 2.		
m	Acute nephritis	25	5
m	Jaundice	25	5

Dowagiac—*C. W. M.*		5	40	2	----	----	----	----	20	2	----	----	40	2	20	3	----	----	40	3	----	----		Carcinoma	20	13
Mattawan *m*		4	50	2	0	0	----	----	25	3	0	0	50	4	0	0	0	0	----	----	0	0	*n*	Gastritis	20	15
Niles—*O. P. H.*		5	100	3	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0		Gastro-duodenitis	20	14
Niles—J. S. R. *n*		5	100	7	0	0	100	12	0	0	0	0	100	6	0	0	0	0	100	8	0	0		Laryngitis	20	11
Otsego *o*		5	20	3	0	0	----	----	0	0	0	0	100	3	0	0	0	0	----	----	0	0	*o*	Rotheln	20	3
St. Joseph *p*		5	0	0	0	0	----	----	0	0	0	0	40	3	40	3	0	0	20	3	0	0	*p*	Less sickness, Oct. 12. Very little sickness, Oct. 19.		
SOUTH'N-CENTRAL DIV.†		*72*	*63*	*4*	*0*	*0*	*58*	*6*	*52*	*5*	*0*	*0*	*77*	*4*	*65*	*6*	*0*	*0*	*66*	*5*	*62*	*4*				
Adrian		5	0	0	0	0	----	----	0	0	0	0	60	3	60	3	0	0	20	4	20	4	*q,r*	See notes "*q*" and "*r*" for Oct., below.		
Albion *q*		5	100	2	0	0	----	----	100	7	0	0	100	6	20	9	0	0	----	----	40	9				
Brooklyn		5	----	----	----	----	----	----	----	----	----	----	40	4	----	----	----	----	----	----	40	3	*s*	Cynanche	50	5
Clinton *r*		5	0	0	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	100	1		See note *s* for Oct., below.		
Coldwater		5	0	0	0	0	40	6	80	5	0	0	100	2	0	0	0	0	100	4	60	6	*t*	General derangement	20	1
Hillsdale *s*		4	50	4	0	0	75	3	25	5	0	0	50	4	0	0	0	0	25	3	0	0		See note *t* for Oct., below.		
Jackson—W. W. *t*		5	20	2	0	0	----	----	20	5	0	0	20	6	0	0	0	0	----	----	100	2	*u*	Syphilis	80	5
Jackson (State Prison) *u*		5	----	----	----	----	----	----	----	----	----	----	100	2	----	----	----	----	100	4	----	----	*v*	Hepatitis	100	5
Kalamazoo		5	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	60	7	100	3		Jaundice	20	5
Marshall		3	33	5	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0	*w*	Diabetes mel.	40	6
Mendon—H. C. C. *v*		5	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	20	3	*x*	Canker sore throat	60	4
Mendon—E. S. *w*		5	0	0	0	0	----	----	40	4	0	0	80	5	0	0	0	0	----	----	100	3		Functional disturbance of liver	80	5
Sturgis		5	60	4	0	0	100	5	40	6	0	0	0	0	0	0	0	0	80	6	40	3		Pharyngitis	100	4
Three Rivers *x*		5	100	4	0	0	20	8	0	0	0	0	100	7	80	10	0	0	----	----	0	0		See note *x* for Oct., below.		
Ypsilanti *y*		5	0	0	0	0	----	----	0	0	0	0	0	0	100	3	0	0	----	----	0	0	*y*	See note *y* for Oct., p. 459.		
SOUTH-EASTERN DIV.†		*45*	*68*	*3*	*100*	*12*	*53*	*7*	*72*	*7*	*0*	*0*	*100*	*4*	*100*	*9*	*0*	*0*	*44*	*10*	*80*	*6*	*z*	Parotiditis	20	13
Detroit—L. C.		5	100	6	100	12	100	8	100	11	0	0	100	5	100	11	0	0	100	14	100	14	*aa* *bb*	See notes *aa*, *bb* for Oct., below.		
Detroit—*E. L.* *z*		5	100	3	0	0	20	9	100	10	0	0	100	6	100	5	0	0	20	7	100	8				
Detroit—W. H. R. *aa*		5	100	3	0	0	----	----	100	6	0	0	100	8	100	10	0	0	----	----	0	0				
Milford		5	0	0	0	0	----	----	20	5	0	0	0	0	0	0	0	0	----	----	100	2	*cc*	Dyspepsia	20	4
Northville *bb*		5	20	1	0	0	----	----	0	0	0	0	100	2	0	0	0	0	----	----	20	1	*dd*	Caries	40	4
Utica—G. G. R. *cc*		5	0	0	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0		Cerebral hyperemia	100	3
Washington *dd*		5	20	3	0	0	40	4	0	0	0	0	100	1	0	0	0	0	----	----	0	0		Dyspepsia	100	1
Wyandotte—E. P. C. *ee*		5	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0		Goitre	100	4
Wyandotte—*T. J. L.* *ff*		5	0	0	0	0	0	0	40	5	0	0	100	5	0	0	0	0	20	8	80	6		Paralysis	20	2
																								Torpidity of liver	40	3
																								Spasmodic croup	20	4
																								Very healthy, Oct. 19. Quite, Oct. 12.		
																							ee	Diphtheritic tonsilitis	60	3
																								Mumps	20	3
																								Purpura	20	3
																							ff	Puerperal convulsions	20	8

* For names of observers, see Exhibit 31, pages 420-1.

† For counties in each division, see Exhibit 1, page 153. The numbers on this line are an average for the division.

‡, §, ‖, ¶. For these references see foot-notes on page 449; for comments on the table see pages 399, 403, 421.

a, b, c, etc. These letters refer across the page, from the names of observers to statements concerning the amount of sickness, and relative to diseases reported them in addition to those printed on the postal blanks.

q One fatal case of diphtheria reported from about 12 miles N. E. of the village.—Oct. 26. Only one case of diphtheria, brother to the one that died last week and likewise fatal.—Nov. 2.

r Unusually healthy, only a few malarial fevers and accidents, with obstetrical cases; August and September increased the sickness, but it is dropping off again.—Oct. 1.

s Bright's disease, one fatal case, week ending Oct. 5. No severe sickness in October; a death from consumption and one from chronic alcoholism were the fatal cases.

t Diphtheria in the vicinity, two weeks ending Oct. 12. Sickness light, Oct. 12 and Nov. 2.

x Continues healthy for this season, two weeks ending Oct. 12. The cold weather has caused more sickness, two weeks ending Oct. 26.

aa Very healthy; a little increase of typhoid fever.—Oct. 5. Still healthy; rather more cases of malarial fever.—Oct. 12. Very little sickness; disease not severe.—Oct. 19. Healthy.—Oct. 26. But little sickness.—Nov. 2. Dr. R. questions the genuineness of diphtheria reported by him Nov. 2.

bb Absent from Northville from Aug. 17 till October; during that time, the other Doctors report typho-malarial type in most cases, with intermitting fevers.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* November *30, 1878.*

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.	
		Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	240	93	3.2	50	7.0	63	8.5	38	9.5	96	5.5	49	7.9	73	5.5	54	6.2	57	8.9	69	7.0	87	2.2	76	3.5	72	5.9	71	5.4
UPPER-PENIN. DIVISION†	*8*	*100*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*5*	*0*	*0*	*0*	*0*	*50*	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*63*	*6*	*50*	*6*	*0*	*0*
Houghton	4	100	2	----	----	----	----	----	----	100	4	----	----	----	----	50	5	----	----	----	----	----	----	50	4	50	6	----	----
Ishpeming	4	100	4	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	0	0	75	7	0	0	0	0
NORTH-WESTERN DIV.†	*7*	*100*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*6*	*0*	*0*	*100*	*1*	*0*	*0*	*0*	*0*	*33*	*6*	*100*	*2*	*75*	*2*	*50*	*4*	*25*	*6*
Cadillac	3	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	33	6	100	2	0	0	0	0	0	0
Manistee	4	100	3	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	1	75	2	50	4	25	6
NORTH-EASTERN DIV.†	*4*	*100*	*3*	*0*	*0*	*0*	*0*	*25*	*7*	*0*	*0*	*0*	*0*	*25*	*4*	*0*	*0*	*0*	*0*	*100*	*4*	*25*	*5*	*0*	*0*	*0*	*0*	*0*	*0*
Alpena	4	100	3	0	0	0	0	25	7	0	0	0	0	25	4	0	0	0	0	100	4	25	5	0	0	0	0	0	0
WESTERN DIVISION†	*18*	*70*	*4*	*0*	*0*	*0*	*0*	*100*	*10*	*100*	*8*	*25*	*5*	*57*	*7*	*43*	*5*	*33*	*7*	*100*	*5*	*100*	*3*	*83*	*2*	*0*	*0*	*25*	*5*
Grand Haven	4	50	4	0	0	0	0	0	0	0	0	25	6	50	7	25	3	25	5	0	0	0	0	100	2	0	0	25	5
Grand Rapids	4	75	3	0	0	0	0	0	0	100	5	0	0	75	5	25	6	0	0	0	0	100	6	100	2	0	0	0	0
Holland	4	0	0	0	0	0	0	0	0	0	0	25	3	50	3	50	3	0	0	100	3	0	0	100	1	0	0	0	0
Ludington	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	25	2	0	0	0	0
Muskegon	2	100	6	0	0	0	0	100	10	100	10	0	0	50	12	100	6	50	8	100	7	100	1	100	2	0	0	0	0
CENTRAL DIVISION†	*40*	*92*	*3*	*75*	*5*	*100*	*8*	*0*	*0*	*97*	*5*	*50*	*4*	*80*	*4*	*50*	*4*	*0*	*0*	*58*	*5*	*88*	*2*	*66*	*3*	*75*	*6*	*100*	*5*
Charlotte	4	100	2	0	0	100	8	0	0	100	12	0	0	100	10	100	4	0	0	0	0	100	3	100	6	100	9	100	8
DeWitt	4	100	2	0	0	0	0	0	0	100	5	0	0	100	1	50	2	0	0	0	0	100	4	50	4	25	5	0	0
Elsie	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	25	1	0	0	100	1
Hastings	4	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0
Howell	4	100	3	75	5	0	0	0	0	100	6	0	0	0	0	0	0	0	0	50	5	100	1	100	2	0	0	0	0
Hubbardston	4	0	0	0	0	0	0	0	0	75	5	0	0	0	0	25	4	0	0	0	0	75	1	25	2	0	0	0	0
Ionia	4	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
North Lansing	4	100	3	0	0	0	0	0	0	100	2	75	3	75	3	25	4	0	0	50	4	100	1	25	3	100	4	0	0
Otisville	4	100	2	0	0	0	0	0	0	100	2	25	5	100	3	0	0	0	0	75	5	75	4	0	0	0	0	0	0
Ovid	4	50	3	0	0	0	0	0	0	0	0	0	0	25	2	0	0	0	0	0	0	25	3	100	1	0	0	0	0
NORTHERN-CENTRAL DIV.†	*4*	*100*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*50*	*3*	*50*	*2*	*0*	*0*	*0*	*0*	*25*	*2*
Big Rapids—*I. W. B.*	4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	3	50	2	0	0	0	0	25	2
BAY AND EASTERN DIV.†	*39*	*89*	*3*	*0*	*0*	*25*	*9*	*33*	*4*	*93*	*6*	*81*	*8*	*100*	*5*	*74*	*7*	*25*	*9*	*69*	*9*	*87*	*1*	*74*	*5*	*0*	*0*	*70*	*6*
Bay City—W. H. B.	4	100	2	0	0	0	0	0	0	100	8	----	----	100	12	100	13	0	0	100	12	100	1	100	5	----	----	100	12
Bay City—W. R. M.	4	100	3	0	0	0	0	0	0	100	5	100	6	100	5	0	0	0	0	0	0	100	1	100	4	0	0	100	6
Bay City—*W. R. McC.*	3	33	2	0	0	0	0	33	4	33	3	0	0	100	2	33	5	0	0	0	0	33	3	33	6	0	0	67	8
Lapeer—A. N.	4	75	7	0	0	0	0	0	0	100	10	100	7	100	5	100	5	0	0	0	0	100	1	0	0	0	0	100	5
Port Huron—*S. W. S.*	4	100	6	0	0	0	0	0	0	100	9	100	9	100	3	0	0	0	0	100	9	100	2	100	5	0	0	0	0
Port Sanilac	4	----	----	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	1	0	0	----	----	50	2
Saginaw City—N. D. L.	4	100	3	0	0	0	0	0	0	100	4	0	0	0	0	25	4	0	0	25	4	100	1	25	5	0	0	0	0
Saginaw City—*I. N. S.*	4	75	5	0	0	25	9	0	0	100	5	25	8	0	0	100	7	25	9	50	9	100	1	100	5	0	0	25	8
Thornville	4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0

West Bay City	4	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	50	3	0	0	50	3
SOUTH-WESTERN DIV.†	*28*	*90*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*88*	*4*	*38*	*5*	*58*	*2*	*31*	*7*	*0*	*0*	*88*	*6*	*89*	*2*	*69*	*4*	*25*	*3*	*75*	*4*
Allegan	4	100	1	0	0	0	0	0	0	100	5	0	0	100	3	25	6	0	0	0	0	100	3	25	7	0	0	0	0
Dowagiac—*C. W. M.*	4	----	----	----	----	----	----	----	----	----	----	----	----	----		----	----	----	----	----	----	100		----	----	25	3	----	----
New Troy—G. H. R.	4	50	3	----	----	----	----	----	----	25	1	----	----	25		25	5	----	----	----	----	25		50	3	----		----	----
Niles—*O. P. H.*	4	100	3	0	0	0	0	0	0	100	4	50	3	0	0	0	0	0	0	100	3	100		0	0	0	0	100	3
Niles—J. S. R.	4	100	7	0	0	0	0	0	0	100	7	25	7	0	0	50	12	0	0	75	9	100	4	100	4	0	0	100	5
Otsego	4	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
St. Joseph	4	100	1	0	0	0	0	0	0	100	3	0	0	50	2	25	4	0	0	0	0	100	3	100	3	0	0	25	3
SOUTHERN-CENTRAL DIV.†	*56*	*94*	*3*	*38*	*8*	*0*	*0*	*0*	*0*	*100*	*6*	*38*	*8*	*71*	*5*	*50*	*8*	*0*	*0*	*63*	*7*	*96*	*2*	*84*	*3*	*0*	*0*	*56*	*6*
Adrian	4	100	2	0	0	0	0	0	0	100	3	0	0	0	0	25	5	0	0	0	0	100	1	50		0	0	0	0
Albion	4	100	4	0	0	0	0	0	0	100	7	0	0	25	1	25	10	0	0	100	7	100	2	100		0	0	0	0
Brooklyn	4	----	----	----	----	----	----	----	----	----	----	----	----	100	2	----	----	----	----	----	----	75	3	----		----		----	----
Clinton	4	100	6	50	10	0	0	0	0	100	9	0	0	75	8	0	0	0	0	75	7	100	2	100	5	0	0	75	8
Coldwater	4	100	4	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	0	0	100	3	100	4	0	0	100	6
Jackson—W. W.	4	100	2	0	0	0	0	0	0	100	4	0	0	100	3	0	0	0	0	0	0	0	0	25	2	0	0	25	6
Jackson (State Prison)	4	100	1	----	----	----	----	----	----	100	5	----	----	----		----	----	----	----	----	----	100	4	----		----		----	----
Kalamazoo	4	75	6	0	0	0	0	0	0	100	8	50	9	100	4	0	0	0	0	0	0	100		100	2	0	0	25	5
Marshall	4	100	2	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	3	100	4	0	0	0	0
Mendon—H. C. C.	4	100	3	0	0	0	0	0	0	100	5	25	6	0	0	0	0	0	0	0	0	100	2	100	2	0	0	0	0
Mendon—E. S.	4	100	1	0	0	0	0	0	0	100		0	0	0	0	0	0	0	0	25	4	75	2	100	3	0	0	0	0
Sturgis	4	50	4	25	6	0	0	0	0	100	5	50	4	0	0	0	0	0	0	0	0	100	1	50	2	0	0	0	0
Three Rivers	4	100	4	0	0	0	0	0	0	100	10	25	11	0	0	100	8	0	0	50	10	100	1	100	4	0	0	0	0
Ypsilanti	4	0	0	0	0	0	0	0	0	0	0	0	0	25	3	0	0	0	0	0	0	100	2	0	0	0	0	0	0
SOUTH EASTERN DIV.†	*36*	*100*	*3*	*0*	*0*	*0*	*0*	*25*	*17*	*97*	*5*	*42*	*16*	*70*	*10*	*70*	*8*	*70*	*10*	*65*	*10*	*78*	*3*	*79*	*4*	*100*	*7*	*95*	*6*
Detroit—L. C.	4	100	3	0	0	0	0	0	0	100	8	25	18	25	17	100	10	100	15	100	15	100	2	100	10	0	0	100	11
Detroit—*E. L.*	4	100	5	0	0	0	0	0	0	100		50	14	100	13	100	11	100	12	75	12	100	4	100	2	100		100	9
Detroit—W. H. R.	4	100	4	0	0	0	0	25	17	100		50	16	100	13	100	11	75	13	100	13	100	4	100	3	100	9	0	0
Milford	4	100	3	0	0	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0	100	2	0	0	0	0	0	0
Northville	4	100	2	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	50	4	75	4	0	0	100	3
Utica—G. G. R.	4	0	0	0	0	0	0	0	0	100	5	0	0	0	0	0	0	50	6	0	0	50	3	50	3	0	0	75	4
Washington	4	100	2	0	0	0	0	0	0	100		0	0	25	3	25	5	0	0	25	4	25	5	0	0	0	0	100	5
Wyandotte—E. P. C.	4	100	3	0	0	0	0	0	0	75	3	0	0	0	0	25	2	25	3	0	0	75		25	3	100	2	0	0
Wyandotte—*T. J. L.*	4	100	3	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	25	7	100		100	2	0	0	0	0

* For names of observers, see Exhibit 31, pages 420–1; for comments on the table, see pages 399, 403, 421.

† For counties in each division, see Exhibit 1, page 153. The numbers on this line are an average for the localities within the division at which the given disease was reported present.

‡, §, ||. For these references, see foot-notes on page 449.

TABLE 3.—*Diseases, by Localities in Michigan, Four Weeks ending* **November** *30, 1878*—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given.—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Influenza. Per ct. of Weeks Present.‡‡	Influenza. Av. Ord. of Prev. when Present.§	Measles. Per ct. of Weeks Present.‡‡	Measles. Av. Ord. of Prev. when Present.§	Neuralgia.¶ Per ct. of Weeks Present.‡‡	Neuralgia.¶ Av. Ord. of Prev. when Present.§	Pneumonia. Per ct. of Weeks Present.‡‡	Pneumonia. Av. Ord. of Prev. when Present.§	Puerperal Fever. Per ct. of Weeks Present.‡‡	Puerperal Fever. Av. Ord. of Prev. when Present.§	Rheumatism. Per ct. of Weeks Present.‡‡	Rheumatism. Av. Ord. of Prev. when Present.§	Scarlatina. Per ct. of Weeks Present.‡‡	Scarlatina. Av. Ord. of Prev. when Present.§	Smallpox. Per ct. of Weeks Present.‡‡	Smallpox. Av. Ord. of Prev. when Present.§	Tonsilitis.¶ Per ct. of Weeks Present.‡‡	Tonsilitis.¶ Av. Ord. of Prev. when Present.§	Whooping-cough. Per ct. of Weeks Present.‡‡	Whooping-cough. Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	240	81	2.8	65	5.2	75	4.5	67	5.1	30	6.6	84	4.3	68	5.6	25	3.0	77	4.8	84	4.1
UPPER-PENINSULAR DIV.†	*8*	*100*	*1*	*25*	*7*	*63*	*5*	*100*	*4*	*0*	*0*	*75*	*4*	*100*	*5*	*0*	*0*	*100*	*2*	*0*	*0*
Houghton	4	100	1	----	----	25	7	100	4	----	----	----	----	100	5	----	----	----	----	----	----
Ishpeming *a*	4	100	1	25	7	100	3	0	0	0	0	75	4	0	0	0	0	100	2	0	0
NORTH-WESTERN DIV.†	7	*75*	*4*	*0*	*0*	*100*	*3*	*57*	*5*	*0*	*0*	*86*	*6*	*0*	*0*	*0*	*0*	*57*	*6*	*50*	7
Cadillac *b*	3	0	0	0	0	100	3	67	4	0	0	100	4	0	0	0	0	100	3	0	0
Manistee	4	75	4	0	0	----	----	50	5	0	0	75	7	0	0	0	0	25	9	50	7
NORTH-EASTERN DIV.†	*4*	*100*	*1*	*75*	*2*	----	----	*25*	*5*	*25*	7	*100*	*4*	*0*	*0*	*0*	*0*	*75*	*3*	*25*	*3*
Alpena *c*	4	100	1	75	2	----	----	25	5	25	7	100	4	0	0	0	0	75	3	25	3
WESTERN DIVISION†	*18*	*79*	*2*	*0*	*0*	*25*	*3*	*50*	*3*	*0*	*0*	*78*	*5*	*64*	*5*	*0*	*0*	*50*	*1*	*100*	*3*
Grand Haven	4	25	2	0	0	0	0	75	4	0	0	100	4	50	7	0	0	0	0	100	2
Grand Rapids	4	100	1	0	0	----	----	0	0	0	0	25	7	75	5	0	0	----	----	100	4
Holland *d*	4	100	2	0	0	----	----	50	3	0	0	100	3	50	3	0	0	----	----	0	0
Ludington *e*	4	0	0	0	0	25	3	25	2	0	0	75	2	0	0	0	0	0	0	0	0
Muskegon	2	100	4	0	0	----	----	0	0	0	0	100	8	100	5	0	0	50	11	0	0
CENTRAL DIVISION†	*40*	*85*	*3*	*0*	*0*	*100*	*4*	*70*	*5*	*38*	*5*	*67*	*4*	*75*	*4*	*0*	*0*	*75*	*4*	*83*	*4*
Charlotte	4	100	2	0	0	----	----	100	9	0	0	100	6	0	0	0	0	----	----	0	0
DeWitt *f*	4	0	0	0	0	100	4	25	5	0	0	100	3	0	0	0	0	100	3	0	0
Elsie	4	0	0	0	0	----	----	25	3	0	0	25	4	0	0	0	0	----	----	0	0
Hastings *g*	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Howell *h*	4	0	0	0	0	----	----	100	4	0	0	0	0	100	5	0	0	----	----	100	4
Hubbardston *i*	4	75	3	0	0	----	----	0	0	0	0	75	3	0	0	0	0	----	----	0	0
Ionia	4	75	3	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
North Lansing	4	0	0	0	0	0	0	100	3	50	5	25	3	50	4	0	0	50	5	0	0
Otisville	4	100	2	0	0	----	----	0	0	0	0	75	4	0	0	0	0	----	----	100	4
Ovid	4	75	3	0	0	----	----	0	0	25	4	0	0	75	4	0	0	----	----	50	3
NORTH'N-CENTRAL DIV.†	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*75*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*75*	*1*
Big Rapids—*I. W. B.*	4	0	0	0	0	0	0	75	3	0	0	0	0	0	0	0	0	0	0	75	1
BAY AND EASTERN DIV.†	*39*	*96*	*3*	*75*	*1*	*86*	*4*	*64*	*6*	*25*	*9*	*85*	*4*	*79*	*7*	*0*	*0*	*86*	*4*	*80*	*5*
Bay City—W. H. B.	4	100	3	0	0	100	6	100	11	----	----	100	5	100	12	0	0	100	7	75	9
Bay City—W. R. M. *j*	4	100	2	0	0	----	----	0	0	0	0	100	5	100	5	0	0	----	----	100	4
Bay City—*W. R. McC.*	3	0	0	0	0	----	----	0	0	0	0	33	3	100	3	0	0	----	----	33	1
Lapeer—A. N.	4	100	2	0	0	100	3	75	8	0	0	100	6	0	0	0	0	100	4	0	0
Port Huron—*S. W. S.* *k*	4	100	3	0	0	100	6	25	8	0	0	100	6	25	9	0	0	100	8	100	5
Port Sanilac	4	0	0	0	0	----	----	50	1	0	0	25	1	0	0	0	0	----	----	0	0
Saginaw City—N. D. L. *l*	4	0	0	0	0	100	2	0	0	0	0	100	3	0	0	0	0	100	3	0	6
Saginaw City—*I. N. S.*	4	100	6	0	0	100	3	50	9	25	9	100	4	75	6	0	0	100	2	0	0
Thornville *m*	4	75	1	75	1	75	4	50	6	0	0	100	4	0	0	0	0	25	5	0	0
West Bay City	4	0	0	0	0	25	1	100	2	0	0	75	2	0	0	0	0	75	2	0	0

DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
a Puerperal eclampsia	25	8
b Spinal fever	67	4
b Spasmodic croup	33	6
c Asthma	50	5
d Bilious fever	100	2
d Nervous fever	75	3
e Very healthy, Nov. 9.		
f Asthma	50	5
f Hematuria	50	5
f Hepatitis	25	5
f Hysteralgia	50	6
f Peritonitis	100	5
g See note *g* for Nov., below.		
h Diphtheria prevails at Fowlerville, 3 weeks ending Nov. 30.		
i Not very much sickness, Nov. 9.		
j See note *j* for Nov., below.		
k Diphtheria mild, but one death to date, Nov. 23.		
l Very healthy, 4 weeks ending Nov. 30.		
m Peritonitis	25	5
n Nothing else to report, 2 weeks ending Nov. 23.		
o Asthma	25	3
o Gastralgia	25	1
o Laryngitis	75	8
p Pharyngitis	25	5
q Very little sickness, Nov. 30.		
r Pneumonia reported by Dr. S. is typhoid pneumonia.		
s Pharyngitis	75	1
s See note *s* for Nov., below.		
t Influenza marked catarrhal, 3 w'ks ending Nov. 23.		
t General derangement	25	1
t Sickness light, Nov. 9, 16, and 30.		

SOUTH WESTERN DIV.†	*28*	*100*	*3*	*0*	*0*	*88*	*7*	*25*	*8*	*0*	*0*	*100*	*4*	*25*	*4*	*25*	*3*	*83*	*3*	*0*	*0*	*u*	Syphilis	50	6
Allegan	4	0	0	0	0	----	----	0	0	0	0	100	4	25	6	0	0	----	----	0	0		Spasmodic croup	25	8
Dowagiac—*C. W. M.*...*n*	4	100	2	----		----	----	----		----	----	----	----	----	----	25	3	----	----	----	----	*v*	Hepatitis	75	6
New Troy—G. H. R. ....*o*	4	----	----	----		100	2	----		----	----	----	----	----	----	----	----	50	1	----	----		Jaundice	25	7
Niles—*O. P. H.*	4	100	2	0	0	----	----	0	0	0	0	100	4	25	3	0	0	----	----	0	0		Pleurisy	25	1
Niles—J. S. R. ....*p*	4	100	4	0	0	75	11	25	8	0	0	100	8	0	0	0	0	100	6	0	0		Canker sore throat	100	3
Otsego ....*q*	4	0	0	0	0	----	----	0	0	0	0	100	2	0	0	0	0	----	----	0	0		Pharyngitis	100	3
St. Joseph	4	0	0	0	0	0	0	0	0	0	0	100	3	25	3	0	0	100	3	0	0	*w*	Sickness abating, 2 weeks ending Nov. 16.		
SOUTHERN-CENTRAL DIV.†	*56*	*66*	*4*	*0*	*0*	*68*	*5*	*75*	*4*	*25*	*8*	*84*	*5*	*63*	*6*	*0*	*0*	*75*	*5*	*88*	*4*				
Adrian ....*r*	4	25	4	0	0	75	4	50	5	0	0	50	4	50	5	0	0	75	5	75	4		Not much sickness, 2 w'ks ending Nov. 30.		
Albion ....*s*	4	100	4	0	0	100	6	100	8	0	0	100	8	0	0	0	0	75	9	100	8				
Brooklyn	4	----	----	----		----	----	100	4	----	----	----	----	----	----	----	----	----	----	100	2		Scarlatina very mild, Nov. 16. Scarlatina prevails, severe though not fatal, Nov. 30 Scarlatina prevails, of a mild form in its course, but rather severe in its sequela, Nov. 3.		
Clinton	4	75	6	0	0	----	----	50	6	0	0	100	5	0	0	0	0	----	----	100	1				
Coldwater	4	0	0	0	0	100	5	100	6	0	0	100	1	0	0	0	0	100	2	50	3				
Jackson—W. W. ....*t*	4	100	1	0	0	----	----	0	0	0	0	50	3	0	0	0	0	----	----	100	3	*x*			
Jackson (State Prison)..*u*	4	----	----	----		----	----	----		----	----	100	3	----	----	----	----	100	3	----	----				
Kalamazoo	4	25	4	0	0	----	----	0	0	25	8	25	8	0	0	0	0	100	6	100	3				
Marshall	4	75	3	0	0	----	----	0	0	0	0	100	4	0	0	0	0	----	----	0	0				
Mendon—H. C. C. ....*v*	4	0	0	0	0	25	5	75	2	0	0	100	5	25	7	0	0	----	----	100	4	*y*	Chicken-pox	75	13
Mendon—E. S.	4	0	0	0	0	----	----	75	3	0	0	100	4	0	0	0	0	25	4	100	3		See note *y* for Nov., below.		
Sturgis	4	0	0	0	0	100	4	100	3	0	0	0	0	0	0	0	0	100	4	50	4				
Three Rivers ....*w*	4	100	5	0	0	50	7	0	0	0	0	100	7	100	9	0	0	----	----	0	0	*z*	Neuralgia or neuralgic rheumatism in abundance	25	2
Ypsilanti ....*x*	4	25	2	0	0	25	3	25	3	0	0	0	0	75	1	0	0	25	3	0	0				
SOUTH EASTERN DIV.†	*36*	*69*	*3*	*75*	*8*	*69*	*5*	*75*	*6*	*0*	*0*	*88*	*4*	*81*	*7*	*0*	*0*	*69*	*6*	*100*	*6*		Neuralgic rheumatism	25	3
Detroit—L. C.	4	100	6	100	9	100	4	100	10	0	0	100	4	100	12	0	0	100	6	100	12	*aa*	Dyspepsia	100	2
Detroit—*E. L.*	4	100	2	0	0	----	----	100	8	0	0	100	5	100	4	0	0	50	8	100	11		Caries	100	5
Detroit—W. H. R. ....*y*	4	100	2	0	0	75	9	100	7	0	0	100	6	100	9	0	0	75	3	0	0		Dyspepsia	100	2
Milford	4	25	4	0	0	----	----	0	0	0	0	25	5	0	0	0	0	----	----	100	1	*bb*	Congestion of brain	100	4
Northville ....*z*	4	100	1	0	0	25	3	0	0	0	0	75	3	0	0	0	0	----	----	100			Goitre	25	4
Utica—G. G. R. ....*aa*	4	75	2	0	0	----	----	0	0	0	0	100	3	0	0	0	0	----	----	0	0		Paralysis	100	5
Washington ....*bb*	4	25	3	0	0	75	4	25	5	0	0	100	2	0	0	0	0	----		0	0		Torpidity of liver	100	3
Wyandotte—E. P. C. ....*cc*	4	0	0	0	0	----	----	25	3	0	0	0	0	25	2	0	0	----	----	0	0	*cc*	Diphtheritic tonsilitis	25	2
Wyandotte—*T. J. L.*	4	25	4	50	7	0	0	100	4	0	0	100	5	0	0	0	0	50	8	0	0				

* For names of observers, see Exhibit 31, pages 420–1.

† For counties in each division, see Exhibit 1, page 153. The numbers on this line are an average for the division.

‡, §, ||, ¶. For these references, see foot-notes on page 449; for comments on the table, see pages 399, 403, 421.

a, b, c, etc. These letters refer across the page, from the names of observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

g No prevailing disease at present; and no sickness of importance.—Nov. 9. But little sickness, Nov. 16. No general disease prevalent, Nov. 23. Mumps the only prevailing disease, Nov. 30.

j Not much change, 2 weeks ending Nov. 16. Nothing marked, Nov. 9. Very little sickness of any kind, Nov. 16. The throat calls for much attention now, although varied in location and virulence, Nov. 25. Nothing severe, few deaths from acute diseases, Nov. 30.

s Pharyngitis often accompanied by diphtheritic membrane, and is quite generally attended with an unusually high grade of febrile symptoms, Nov. 9. The diphtheritic tendency in tonsilitis and pharyngitis seems to have in a measure disappeared, Nov. 16. Both tonsilitis and pharyngitis seem to take on a diphtheritic form, Nov. 23. Many diphtheritic symptoms in throat diseases, as last week, Nov. 30.

y Very healthy, Nov. 9. Very little change since last report, except a little increase of throat troubles, Nov. 16. Considerable increase of throat troubles and diseases a little more severe than for last few weeks, Nov. 23. Catarrhal troubles somewhat common, otherwise very little sickness. We have had pleasant fall weather. Dr. R. questions the genuineness of the croup and diphtheria reported by him.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **December** *28, 1878.*

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given.—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.	
		Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev when Present.§
ALL LOCALITIES	234	93	3.0	50	7.0	100	8.0	44	7.2	91	5.6	67	8.6	75	5.2	55	7.1	43	9.0	75	6.7	84	2.9	84	4.5	73	6.9	67	7.1
UPPER PENIN. DIVISION†	*4*	*100*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*50*	*3*	*0*	*0*
Houghton	4	100	2	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	3	0	0
NORTH-WESTERN DIV	*4*	*100*	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*6*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*75*	*1*	*25*	*2*	*0*	*0*	*0*	*0*
Manistee	4	100	4	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	75	1	25	2	0	0	0	0
NORTH-EASTERN DIV.†	*4*	*100*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*25*	*5*	*0*	*0*	*0*	*0*	*25*	*5*	*0*	*0*	*50*	*4*	*25*	*5*	*0*	*0*	*0*	*0*	*0*	*0*
Alpena	4	100	3	0	0	0	0	0	0	25	5	0	0	0	0	25	5	0	0	50	4	25	5	0	0	0	0	0	0
WESTERN DIVISION†	*20*	*90*	*3*	*25*	*7*	*0*	*0*	*100*	*8*	*100*	*7*	*25*	*7*	*50*	*7*	*56*	*5*	*38*	*7*	*63*	*5*	*70*	*3*	*94*	*2*	*50*	*3*	*0*	*0*
Grand Haven	4	100	3	----	----	----	----	----	----	----	----	25	7	----	----	75	5	50	5	----	----	25	4	75	4	----	----	----	----
Grand Rapids	4	100	3	25	7	0	0	0	0	100	5	0	0	50	7	25	6	0	0	0	0	100	6	100	2	0	0	0	0
Holland	4	50	3	0	0	0	0	0	0	0	0	0	0	0	0	25	3	0	0	25	4	25	2	100	1	50	3	0	0
Ludington	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0
Muskegon	4	100	3	0	0	0	0	100	8	100	9	0	0	0	0	100	7	25	8	100	7	100	1	100	2	0	0	0	0
CENTRAL DIVISION†	*41*	*93*	*3*	*25*	*5*	*100*	*8*	*33*	*7*	*94*	*4*	*67*	*11*	*90*	*4*	*50*	*5*	*0*	*0*	*53*	*6*	*86*	*3*	*88*	*4*	*70*	*9*	*83*	*5*
Charlotte	3	100	2	0	0	100	8	0	0	100	12	0	0	100	10	100	5	0	0	0	0	100	4	100	7	100	11	100	9
DeWitt	4	100	2	25	5	0	0	0	0	100	5	0	0	100	1	0	0	0	0	75	5	0	0	0	0	0	0	0	0
Elsie	3	0	0	0	0	0	0	33	3	0	0	0	0	33	3	0	0	0	0	0	0	67	3	33	2	0	0	67	1
Flint—*J. B. F. C.*	3	100	6	0	0	0	0	33	11	100	5	67	11	100	6	67	9	0	0	67	9	100	4	100	8	67	11	0	0
Hastings	4	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	75	2	0	0	0	0	0	0
Howell	4	100	4	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
Hubbardston	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ionia	4	50	5	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
North Lansing	4	100	3	0	0	0	0	0	0	100	2	0	0	100	3	25	4	0	0	25	4	100	4	0	0	50	5	0	0
Otisville	4	100	1	0	0	0	0	0	0	100	3	0	0	100	2	25	3	0	0	50	4	50	4	0	0	0	0	0	0
Ovid	4	100	2	0	0	0	0	0	0	50	1	0	0	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0
NORTHERN-CENTRAL DIV.†	*4*	*50*	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*25*	*5*	*100*	*3*	*0*	*0*	*0*	*0*	*50*	*5*	*50*	*3*	*25*	*4*	*0*	*0*	*25*	*6*
Big Rapids—*I. W. R.*	4	50	4	0	0	0	0	0	0	0	0	25	5	100	3	0	0	0	0	50	5	50	3	25	4	0	0	25	6
BAY AND EASTERN DIV.	*38*	*97*	*4*	*0*	*0*	*0*	*0*	*25*	*9*	*100*	*7*	*50*	*7*	*63*	*6*	*42*	*7*	*0*	*0*	*80*	*7*	*100*	*9*	*85*	*6*	*0*	*0*	*70*	*7*
Bay City—W. H. P.	4	100	2	0	0	0	0	0	0	100	9	0	0	25	12	75	12	0	0	100	11	100	1	100	10	0	0	75	13
Bay City—W. R. M.	4	100	3	0	0	0	0	0	0	100	5	75	6	75	6	25	4	0	0	0	0	100	1	100	5	0	0	0	0
Bay City—*W. R. McC.*	2	0	0	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lapeer—A. N.	4	75	8	0	0	0	0	0	0	100	9	0	0	100	7	25	7	0	0	0	0	100	2	0	0	0	0	100	6
Port Huron—*S. W. S.*	4	100	4	0	0	0	0	0	0	100	11	25	10	100	8	0	0	0	0	100	8	100	2	100	6	0	0	0	0
Port Sanilac	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Saginaw City—N. D. I.	4	100	3	0	0	0	0	0	0	100	5	50	5	0	0	25	6	0	0	75	5	100	1	0	0	0	0	50	5
Saginaw City—*I. N. S.*	4	100	3	0	0	0	0	25	9	100	5	50	8	50	7	75	6	0	0	75	7	100	1	50	6	0	0	25	7
Thornville	4	100	4	0	0	0	0	0	0	0	0	0	0	25	4	25	6	0	0	0	0	100	3	0	0	0	0	100	6
West Bay City	4	100	2	0	0	0	0	0	0	0	0	0	0	50	3	0	0	0	0	50	3	100	2	75	2	0	0	0	0

SOUTH-WESTERN DIV.†	*26*	*100*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*4*	*100*	*6*	*87*	*2*	*50*	*11*	*0*	*0*	*100*	*6*	*83*	*3*	*100*	*5*	*100*	*5*	*63*	*6*
Allegan	4	100	1	0	0	0	0	0	0	100	4	0	0	100	3	0	0	0	0	0	0	75	4	0	0	0	0	0	0
Dowagiac—*C. W. M.*	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100	2	----	----	----	----	----	----
Mattawan	3	0	0	0	0	0	0	0	0	100	4	0	0	33	2	0	0	0	0	0	0	0	0	0	0	100	5	0	0
Niles—*O. P. H.*	4	100	2	0	0	0	0	0	0	100	3	100	2	100	2	0	0	0	0	100	3	100	2	0	0	0	0	75	4
Niles—J. S. R.	4	100	3	----	----	----	----	----	----	100	4	100	10	-	----	50	11	----	----	100	9	100	6	100	7	----	-	50	8
Otsego	4	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
St. Joseph	4	100	1	0	0	0	0	0	0	100	3	0	0	100	2	0	0	0	0	0	0	25	2	100	3	0	0	0	0
SOUTHERN-CENTRAL DIV.†	*57*	*91*	*3*	*100*	*9*	*0*	*0*	*25*	*5*	*82*	*6*	*90*	*6*	*58*	*5*	*63*	*9*	*25*	*9*	*63*	*7*	*85*	*3*	*89*	*4*	*0*	*0*	*75*	*8*
Adrian	4	75	3	0	0	0	0	25	5	50	4	0	0	50	2	0	0	0	0	0	0	100	2	25	4	0	0	0	0
Albion	4	100	4	0	0	0	0	0	0	100	7	0	0	0	0	25	10	25	9	100	7	100	3	100	5	0	0	0	0
Brooklyn	4	25	3	0	0	0	0	0	0	0	0	0	0	50	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clinton	4	100	5	100	9	0	0	0	0	100	9	0	0	25	8	0	0	0	0	25	7	25	2	100	6	0	0	50	9
Coldwater	4	100	2	0	0	0	0	0	0	25	7	0	0	0	0	0	0	0	0	0	0	100	3	100	5	0	0	100	6
Hillsdale	2	50	6	0	0	0	0	0	0	50	4	50	3	50	5	0	0	0	0	0	0	0	0	100	2	0	0	0	0
Jackson—W. W.	4	100	1	0	0	0	0	0	0	100	5	0	0	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jackson (State Prison)	3	100	1	----	----	----	----	----	----	100	5	----	----	----	----	----	----	----	----	----	----	100	4	----	----	----	-	----	----
Kalamazoo	4	100	6	0	0	0	0	0	0	100	10	100	9	100	8	0	0	0	0	0	0	100		100	3	0	0	0	0
Marshall	4	100	1	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	4	100	5	0	0	0	0
Mendon—H. C. C.	4	100	2	0	0	0	0	0	0	100	7	100	7	0	0	0	0	0	0	0	0	100	5	100	4	0	0	0	0
Mendon—E. S.	4	100	1	0	0	0	0	0	0	25	4	0	0	0	0	0	0	0	0	0	0	50	2	75	2	0	0	0	0
Sturgis	4	100	2	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	50	3	0	0	0	0	0	0
Three Rivers	4	100	3	0	0	0	0	0	0	100	10	0	0	0	0	100	8	0	0	0	0	100	2	100	7	0	0	0	0
Ypsilanti	4	----	----	0	0	0	0	0	0	0	6	0	0	25	3	0	0	0	0	0	0	100	2	0	0	0	0	0	0
SOUTH EASTERN DIV.†	*36*	*94*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*91*	*6*	*75*	*15*	*88*	*8*	*81*	*10*	*50*	*10*	*100*	*10*	*86*	*4*	*80*	*6*	*81*	*8*	*65*	*8*
Detroit—L. C.	4	100	2	0	0	0	0	0	0	100	6	25	18	100	14	100	13	50	16	100	14	100	2	100	10	0	0	100	14
Detroit—*E. L.*	4	100	5	0	0	0	0	0	0	100	10	100	13	100	13	100	11	100	8	100	11	100	4	100	3	100	11	100	10
Detroit—W. H. R.	4	100	3	0	0	0	0	0	0	100	8	100	15	100	11	100	13	25	15	100	9	100		100	6	100	13	0	0
Milford	4	100	3	----	----	----	----	----	----	----		----		100	5	----	----	----		----	----	100	1	----	----	----	-	----	----
Northville	4	50	4	0	0	0	0	0	0	100	4	0	0	100	1	0	0	0	0	0	0	0	0	0	0	0	0	25	5
Utica—G. G. R.	4	100	5	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	0	0	0	0	50	5	0	0	75	6
Washington	4	100	1	0	0	0	0	0	0	100	3	0	0	25	4	0	0	0	0	100	4	75	5	0	0	0	0	25	5
Wyandotte—E. P. C.	4	100	2	0	0	0	0	0	0	25	3	0	0	0	0	25	2	25	2	0	0	75	2	0	0	50	1	0	0
Wyandotte—*T. J. L.*	4	100	1	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	0	0	50	6	50	7	75	6	0	0

* For names of observers, see Exhibit 31, pages 420-1; for comments on the table, see pages 399, 403, 421.
† For counties in each division, see Exhibit 1, page 153. The numbers on this line are an average for the division.
‡, §, ||. For these references, see foot-notes on page 449.

TABLE 3.—*Diseases, by Localities in Michigan, Four Weeks ending* **December** *28, 1878*—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED.* (Where there were, during the year, two or more observers at one place, their initials are given,—Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Influenza. Per ct. of Weeks Present.‡	Influenza. Av. Ord. of Prev. when Present.§	Measles. Per ct. of Weeks Present.‡	Measles. Av. Ord. of Prev. when Present.§	Neuralgia.¶ Per ct. of Weeks Present.‡	Neuralgia.¶ Av. Ord. of Prev. when Present.§	Pneumonia. Per ct. of Weeks Present.‡	Pneumonia. Av. Ord. of Prev. when Present.§	Puerperal Fever. Per ct. of Weeks Present.‡	Puerperal Fever. Av. Ord. of Prev. when Present.§	Rheumatism. Per ct. of Weeks Present.‡	Rheumatism. Av. Ord. of Prev. when Present.§	Scarlatina. Per ct. of Weeks Present.‡	Scarlatina. Av. Ord. of Prev. when Present.§	Small-pox. Per ct. of Weeks Present.‡	Small-pox. Av. Ord. of Prev. when Present.§	Tonsilitis.¶ Per ct. of Weeks Present.‡	Tonsilitis.¶ Av. Ord. of Prev. when Present.§	Whooping-cough. Per ct. of Weeks Present.‡	Whooping-cough. Av. Ord. of Prev. when Present.§
ALL LOCALITIES‖	234	83	2.7	71	4.3	77	4.7	72	4.8	57	8.0	90	4.0	64	5.8	0	0	67	3.8	91	4.5
UPPER-PENINSULAR DIV.†	*4*	*100*	*1*	*0*	*0*	*100*	*2*	*50*	*4*	*0*	*0*	*100*	*4*	*50*	*4*	*0*	*0*	----	----	*0*	*0*
Houghton *a*	4	100	1	0	0	100	2	50	4	0	0	100	4	50	4	0	0	----	----	0	0
NORTH WESTERN DIV.†	*4*	*100*	*2*	*0*	*0*	----	----	*50*	*4*	*0*	*0*	*100*	*5*	*0*	*0*	*0*	*0*	*25*	*8*	*100*	*5*
Manistee	4	100	2	0	0	----	----	50	4	0	0	100	5	0	0	0	0	25	8	100	5
NORTH EASTERN DIV.†	*4*	*100*	*1*	*50*	*3*	*25*	*4*	*75*	*4*	*0*	*0*	*100*	*2*	*0*	*0*	*0*	*0*	*75*	*3*	*25*	*3*
Alpena	4	100	1	50	3	25	4	75	4	0	0	100	2	0	0	0	0	75	3	25	3
WESTERN DIVISION†	*20*	*75*	*2*	*100*	*2*	*67*	*7*	*50*	*7*	*0*	*0*	*85*	*5*	*100*	*8*	*0*	*0*	*63*	*7*	*100*	*3*
Grand Haven	4	----	----	----	----	25	3	100	5	----	----	75	7	100	8	----	----	25	2	100	1
Grand Rapids	4	100	1	0	0	----	----	25	6	0	0	75	7	100	6	0	0	----	----	100	4
Holland *b*	4	25	2	0	0	----	----	0	0	0	0	100	3	0	0	0	0	----	----	0	0
Ludington	4	0	0	100	2	100	5	25	6	0	0	100	4	0	0	0	0	----	----	0	0
Muskegon	4	100	4	0	0	75	13	50	10	0	0	75	6	100	9	0	0	100	12	----	----
CENTRAL DIVISION†	*41*	*67*	*3*	*0*	*0*	*91*	*3*	*76*	*4*	*57*	*8*	*84*	*3*	*64*	*5*	*0*	*0*	*82*	*4*	*82*	*7*
Charlotte	3	100	2	0	0	----	----	100	7	0	0	100	3	0	0	0	0	----	----	0	0
DeWitt *c*	4	0	0	0	0	100	4	75	4	0	0	100	3	25	4	0	0	100	4	0	0
Elsie	3	0	0	0	0	----	----	33	1	0	0	67	3	0	0	0	0	----	----	0	0
Flint—*J. B. F. C.* *d*	3	100	4	0	0	100	3	100	9	67	11	100	2	100	9	0	0	100	3	33	11
Hastings *e*	4	25	3	0	0	----	----	75	4	0	0	0	0	0	0	0	0	----	----	0	0
Howell *f*	4	100	5	0	0	----	----	100	2	0	0	0	0	0	0	0	0	----	----	100	6
Hubbardston	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
Ionia	4	75	3	0	0	0	0	25	5	0	0	25	4	0	0	0	0	----	----	0	0
North Lansing	4	50	1	0	0	----	----	100	4	50	5	100	5	0	0	0	0	50	4	----	----
Otisville	4	75	3	0	0	75	3	0	0	0	0	100	4	0	0	0	0	----	----	100	4
Ovid	4	25	3	0	0	----	----	75	3	0	0	0	0	75	3	0	0	----	----	0	0
NORTH'N-CENTRAL DIV.†	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*5*	*0*	*0*	*75*	*5*	*0*	*0*	*0*	*0*	*75*	*2*	*100*	*1*
Big Rapids—*I. W. B.* *g*	4	0	0	0	0	0	0	100	5	0	0	75	5	0	0	0	0	75	2	100	1
BAY AND EASTERN DIV.†	*38*	*100*	*3*	*100*	*3*	*96*	*4*	*79*	*6*	*0*	*0*	*94*	*4*	*32*	*7*	*0*	*0*	*82*	*4*	*93*	*4*
Bay City—W. H. B.	4	100	3	0	0	100	6	100	9	0	0	100	4	25	15	0	0	100	7	100	5
Bay City—W. R. M. *h*	4	100	3	0	0	----	----	100	5	0	0	100	5	25	6	0	0	----	----	100	3
Bay City—*W. R. McC.*	2	0	0	0	0	----	----	50	3	0	0	0	0	50	1	0	0	----	----	50	1
Lapeer—A. N.	4	100	1	0	0	100	5	100	7	0	0	100	5	50	11	0	0	100	3	0	0
Port Huron—*S. W. S.*	4	100	4	0	0	75	7	100	10	0	0	100	6	0	0	0	0	75	1	100	5
Port Sanilac	4	0	0	0	0	----	----	100	1	0	0	50	2	0	0	0	0	----	----	0	0
Saginaw City—N. D. L. *i*	4	0	0	0	0	100	2	25	5	0	0	100	4	0	0	0	0	100	3	0	0
Saginaw City—*I. N. S.*	4	100	5	0	0	100	3	50	8	0	0	100	4	25	5	0	0	100	3	0	0
Thornville	4	100	1	100	3	100	4	0	0	0	0	100	5	0	0	0	0	25	7	0	0
West Bay City *j*	4	0	0	0	0	100	2	75	2	0	0	100	1	25	3	0	0	75	1	0	0
SOUTH-WESTERN DIV.†	*26*	*93*	*3*	*0*	*0*	*25*	*3*	*71*	*3*	*0*	*0*	*92*	*3*	*67*	*4*	*0*	*0*	*56*	*2*	*0*	*0*
Allegan	4	0		0	0	----	----	0	0	0	0	100	3	100	6	0	0	----	----	0	0

	DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
a	Chicken-pox	50	2
b	Bilious fever	50	3
	Nervous fever	50	4
c	Abscess	25	4
	Dropsy	75	5
	Hysteralgia	25	5
	Hæmoptysis	50	5
	Insanity	100	5
	Periostitis	75	5
d	Eczema	33	10
	Nephritis	33	11
	Puerperal convulsions	33	11
	Spasmodic croup	67	11
e	Mumps	100	1
	Mumps accompanied with a good deal of fever, week ending Dec. 28.		
f	Diphtheria prevails at Fowlerville, 3 weeks ending Dec. 21.		
g	Spasmodic croup	50	5
h	Little change, weeks ending Dec. 7 and 14. Little sickness, 2 weeks ending Dec. 7 and 14. Whooping cough epidemic, 2 weeks ending Dec. 28. Healthy Dec. 21.		
i	Very healthy excepting colds, Dec. 7. Very healthy except cases of a simple nature, Dec. 21.		
j	Very healthy, Dec. 7.		
k	Acute nephritis	100	4
	Phlebitis	33	6
l	Angina simplex	50	1
	Cancer	25	10
	Laryngitis	25	12
	Pharyngitis	50	3
m	Chicken-pox	25	2

Dowagiac—*C. W. M.*	3	100	2	----	----	----	----	33	2	----	----	33	3	----	----	----	----	33	1	----	----
Mattawan ..... *k*	3	67	2	0	0	----	----	0	0	0	0	100	3	100	3	0	0	33	3	0	0
Niles—*O. P. H.*	4	100	3	0	0	25	3	100	3	0	0	100	4	25	3	0	0	50	2	0	0
Niles—J. S. R. ..... *l*	4	100	6	----	----	----	----	----	----	----	----	100	6	----	----	----	----	50	1	----	----
Otsego ..... *m*	4	0	0	0	0	----	----	0	0	0	0	100	2	0	0	0	0	----	----	0	0
St. Joseph ..... *n*	4	0	0	0	0	0	0	0	0	0	0	100	3	50	3	0	0	100	1	----	----
SOUTH'N-CENTRAL DIV.†	*57*	*78*	*3*	*0*	*0*	*73*	*5*	*76*	*4*	*0*	*0*	*88*	*4*	*60*	*6*	*0*	*0*	*62*	*4*	*92*	*4*
Adrian ..... *o*	4	25	5	0	0	75	3	25	3	0	0	75	2	50	4	0	0	25	4	75	2
Albion ..... *p*	4	100	2	0	0	75	7	100	7	0	0	100	6	0	0	0	0	25	2	100	10
Brooklyn ..... *q*	4	0	0	0	0	----	----	50	3	0	0	25	2	0	0	0	0	----	----	100	1
Clinton	4	100	2	0	0	----	----	100	5	0	0	100		0	0	0	0	50	6	100	1
Coldwater ..... *r*	4	0	0	0	0	100	6	100	7	0	0	100		50	7	0	0	100	1	75	7
Hillsdale ..... *s*	2	0	0	0	0	50	2	100	4	0	0	50	3	50	4	0	0	50	1	0	0
Jackson—W. W. ..... *t*	4	100	1	0	0	----	----	100	4	0	0	100	2	50	7	0	0	50	5	100	5
Jackson (State Prison) ..... *u*	3	----	----	----	----	----	----	----	----	----	----	100	2	----	----	----	----	100	3	----	----
Kalamazoo	4	100	2	0	0	0	0	0	0	0	0	100	7	50	11	0	0	100	5	100	5
Marshall	4	75	2	0	0	----	----	25	3	0	0	100	4	25	7	0	0	----	----	0	0
Mendon—H. C. C. ..... *v*	4	25	7	0	0	100	5	100	3	0	0	100	5	0	0	0	0	75	7	100	1
Mendon—E. S. ..... *w*	4	0	0	0	0	----	----	50	4	0	0	75	3	0	0	0	0	----	----	75	3
Sturgis		0	0	0	0	50	4	100	1	0	0	0	0	0	0	0	0	50	4	0	0
Three Rivers ..... *x*	4	100	4	0	0	100	7	0	0	0	0	100	6	100	9	0	0	----	----	0	0
Ypsilanti ..... *y*	4	0	0	0	0	25	3	0	0	0	0	0	0	100	1	0	0	0	0	0	0
SOUTH-EASTERN DIV.†	*36*	*83*	*2*	*58*	*6*	*69*	*7*	*66*	*6*	*0*	*0*	*94*	*4*	*79*	*5*	*0*	*0*	*67*	*5*	*100*	*7*
Detroit—L. C.		100	5	100	10	100	4	100	10	0	0	100	5	100	8	0	0	100	8	100	13
Detroit—*E. L.*		100	1	0	0	----	----	100	7	0	0	100	5	100	4	0	0	75	6	100	11
Detroit—W. H. R. ..... *z*		100	1	0	0	100	12	100	6	0	0	100	4	100	7	0	0	100	2	0	0
Milford		25	4	----	----	----	----	25	4	----	----	75	5	----	----	----	----	----	----	100	2
Northville ..... *aa*		100	2	0	0	----	----	25	4	0	0	75	4	0	0	0	0	----	----	100	3
Utica—G. G. R. ..... *bb*		100	2	0	0	----	----	50	5	0	0	100	4	75	4	0	0	50	3	0	0
Washington ..... *cc*		100	4	50	4	50	4	25	5	0	0	100	2	0	0	0	0	25	4	0	0
Wyandotte—E. P. C.		25	1	0	0	----	----	0	0	0	0	0	0	50	1	0	0	----	----	0	0
Wyandotte—*T. J. L.*		100	2	25	4	25	6	100	4	0	0	100	5	50	6	0	0	50	6	0	0

n	Almost no sickness in diseases reported, Dec. 28.		
o	Mumps	25	4
p	Chicken-pox	50	6
	Pharyngitis	100	3
	The diphtheritic element seems to have disappeared from the pharyngitis, Dec. 7.		
q	See note *q* for Dec., below.		
r	Scarlet fever confined to one family, thus far, Dec. 21.		
s	Cynanche	50	1
	Cases of all types rare and mild, Dec. 28.		
t	Sickness light, Dec. 28.		
u	Syphilis	100	6
v	Pericarditis	25	7
w	Opthalmia	25	3
	Pharyngitis	25	2
	Spinal anemia	25	3
x	Canker sore throat	100	4
	Paralysis	75	10
	Pharyngitis	100	2
	Not very sickly, 4 weeks Dec. 28.		
y, *z*, *aa*	See notes *y*, *z*, and *aa* for Dec., below.		
bb	Dyspepsia	75	1
cc	Caries	100	4
	Cerebral hyperemia	50	4
	Dyspepsia	100	3
	Paralysis	100	4
	Torpid liver	75	4
	Goitre	50	4

* For names of observers, see Exhibit 31, pages 420–1.

† For counties in each division, see Exhibit 1, page 133. The numbers on this line are an average for the division.

‡, §, ||, ¶. For explanations of the methods of compiling this table, etc., see foot-notes on page 469; for comments, see pages 393, 403, 421.

a, *b*, *c*, *etc.* These letters refer across the page, from the names of observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

q There were no cases of diphtheria in this locality last week, and we hope it is ended for the present. The people have *finally* become convinced that the disease is contagious, and as a natural consequence it has spread no further.—Dec. 27.

y Scarlatina prevails, Dec. 7. Scarlatina is lessening, general health is very good, Dec. 14.

z Genuineness of croup and diphtheria questioned. Some increase of throat difficulties and of erysipelas; no report of puerperal fever; not much sickness.—Dec. 7. Scarlatina is becoming more common in the eastern part of the city; throat diseases are common.—Dec. 14. Throat difficulties are rather common all over the city; scarlatina in some parts.—Dec. 21. Considerable sore throat, variously termed influenza, sore throat, and diphtheria; not much sickness.—Dec. 28.

aa Diphtheria not severe and hardly the proper term, but I know of no better term, as it is nearer that than anything else.

For want of room on the same pages with the table, some of the longer side-notes to Table 3 are printed here. The reference letters before each note refer to the locality for which the note is a statement. The names of the localities, distinguished by the same letters, may be found in the first column of the table, on pages 424–5, for the January notes; on pages 428–9, for the the February notes; on pages 432–3, for the March notes. Additional remarks relative to some of the same localities may be found in the last column on the pages mentioned.

ADDITIONAL NOTES FOR JANUARY. (*See pages 424–5.*)

h Very little sickness, 4 weeks ending Feb. 2. I do not know a more healthy time within the last 33 years, Jan. 12.

o But very little sickness from acute diseases, Jan. 5.

p But very few cases of acute diseases, Jan. 5 and 19.

s For the month of January, 1878, the temperature has been very variable, the mercury ranging from 8° below zero to 49° above; the warmest day being the 20th and the coldest the 5th and 7th. Ozone was in greater quantity than ever before noticed here; greatest coloration, 9,—on the 10th and 15th; least, on the 19th, when there was not a trace. During the month the health of the place has been quite good. The prevailing disease was rheumatism. Towards the latter part of the month there were two deaths said to be cases of diphtheria. Intermittent fever and remittent fever have disappeared.—Feb. 1, 1879.

t One death from cancer of uterus, week ending Jan. 5.

w Amount of sickness very slight, Jan. 26. First appearance of diphtheria (contagion probably imported from Concord, Jackson co.), week ending Feb. 2.

bb Very little illness, 3 weeks ending Jan. 19. Diphtheritic sore throat prevails, Jan. 26.

ADDITIONAL NOTES FOR FEBRUARY. (*See pages 428–9.*)

h Very little sickness and very little change in the sickness, 4 weeks ending March 2.

j Within the last ten days there have been three cases of scarlet fever in this city, one of which resulted fatally. There have also been about fifteen cases of chicken-pox in the city. The cases of diphtheria have disappeared; the family where there were three deaths from it were poor, with scanty clothing, and ill-fed; the well from which they obtained their water-supply was close to their own privy, and also to their neighbor's privy. There can be no doubt but that it was true diptheria.—Feb. 11, 1878.

m Health of the city excellent; there are some chronic cases not reported, Feb. 16. A general time of health, diseases all mild, Feb. 23.

s Mumps disappearing; two cases scarlatina communicated by contagion, week ending Feb. 2. Pleurisy, 1 case, March 2.

t Two or three new cases of scarlatina, week ending Feb. 9. Very small amount of sickness, Feb. 23.

cc Still healthy, Feb. 9. Quite a number of cases of sore throat attended by very marked cerebral disturbances, some with nausea and vomiting, Feb. 23. Diarrhea has appeared quite frequently; it is usually attended with very severe headache, often with much pain in the bowels; considerable ozone in the air at beginning of the week, less diarrhea at end of the week,—week ending March 2. Dr. Rouse questions the genuineness of the diphtheria reported, and of the croup reported the two weeks ending Feb. 9.

ADDITIONAL NOTES FOR MARCH. (*See pages 432–3.*)

h Hardly enough sickness to tell what disease is the most prevalent, March 21.

i Little change from week to week, March 9. Increased throat ailments, March 16. Some increase of inflammation of the mucous membrane of the throat; nothing serious yet,—March 23. No sickness in excess, the air passages most marked in irritation,—March 30.

k But little sickness, March 16. This season has been one of extreme health, though some diseases have been slow of cure, especially those of mucous surfaces. Gonorrhœa has proved very slow and tedious; also cystitis, especially in pregnant women. Our epidemic of scarlatina which opened up the winter and was extremely mild, no deaths having occurred, has I think subsided entirely. Strange to say we have had no pneumonia. Phthisical patients have fared badly, and have failed rapidly. Our city is in a condition to develop considerable malaria at the opening of hot weather.—March 21.

DISEASES WHICH CAUSE MOST SICKNESS.

By the evidence in the third and fourth figure-columns of Table 1, pages 404–5, the diseases which caused the most sickness in Michigan in 1878 seem to have been, naming them as nearly as possible in the order of their prevalence, those from which there was the most sickness first:—

Intermittent fever, bronchitis, rheumatism, consumption, remittent fever, influenza, diarrhea, pneumonia.

The relative amount of sickness from these diseases is, perhaps, better denoted in Exhibit A, which gives the per cent of reports stating presence of each disease and the average order of prevalence of each while present at the localities where it was reported.

In this connection reference may be made to Table 1, pages 400–1, to the paragraph following that table on page 401, and to the first four figure-columns, for each month, of Table 2, for the State, pages 406–9, wherein some idea is given of the relative prevalence, of the several diseases tabulated, in different months of the year.

EXHIBIT A.—*Diseases from which there seems to have been the Most Sickness in Michigan in 1878, as indicated by the Per Cent of Weekly Reports which stated Presence of the Diseases, studied in connection with the Average Order of Prevalence of said diseases when they were reported present.*

Order.	Diseases in order of apparent amount of sickness, most prevalent one first.	Per Cent of Reports Stating Presence of.	Av. Order of Prevalence when Present.*
1	Intermittent fever	82	2.1
2	Bronchitis	64	3.3
3	Rheumatism	68	4.2
4	Consumption, pulmonary	71	5.2
5	Remittent fever	58	3.1
6	Influenza	44	3.1
7	Diarrhea	41	4.2
8	Pneumonia	41	4.8
	Average of 22 Diseases	30	4.4
9	Scarlet fever	25	5.4
10	Typho-malarial fever	24	5.4
11	Diphtheria	23	5.4
12	Erysipelas	21	6.4

* The greatest possible relative prevalence is marked 1.

In Exhibits A and B the diseases are arranged in order of prevalence judging from the per cent of reports in connection with the order of prevalence when present; in Exhibits 33–42, pages 480–504, a study is made of certain diseases, the months being arranged in order with reference only to the per cent of reports stating presence of each disease in each month of the year; a column is given, however, stating for each month the average order of prevalence of the disease when prevalent, in which statements may be found the explanation of some apparent exceptions with regard to the relations of meteorological phenomena to the per cent of reports alone.

TABLE 4.—*Exhibiting for each of the Six Geographical Divisions of the State from which the most reports were received, a Summary relative to the Diseases in 1878,—indicating the Prevalence as regards both Time and Area, and also the comparative Severity of the Diseases.—A summary from statements on pages 413–419, and on pages 422–469.*

DISEASES.	Western Division.*				Central Division.*				Bay and Eastern Division.*				South-Western Division.*				Southern-Central Division.*				South-Eastern Division.*			
	Per Cent of Observers Reporting Presence of,[b]	Av. Per Cent of Weeks Reported Present where Present,[c]	Per Cent of Reports Stating Presence of,[d]	Av. Order of Prevalence where Present,[e]	Per Cent of Observers Reporting Presence of,[b]	Av. Per Cent of Weeks Reported Present where Present,[c]	Per Cent of Reports Stating Presence of,[d]	Av. Order of Prevalence where Present,[e]	Per Cent of Observers Reporting Presence of,[b]	Av. Per Cent of Weeks Reported Present where Present,[c]	Per Cent of Reports Stating Presence of,[d]	Av. Order of Prevalence where Present,[e]	Per Cent of Observers Reporting Presence of,[b]	Av. Per Cent of Weeks Reported Present where Present,[c]	Per Cent of Reports Stating Presence of,[d]	Av. Order of Prevalence where Present,[e]	Per Cent of Observers Reporting Presence of,[b]	Av. Per Cent of Weeks Reported Present where Present,[c]	Per Cent of Reports Stating Presence of,[d]	Av. Order of Prevalence where Present,[e]	Per Cent of Observers Reporting Presence of,[b]	Av. Per Cent of Weeks Reported Present where Present,[c]	Per Cent of Reports Stating Presence of,[d]	Av. Order of Prevalence where Present,[e]
Av. for Tabulated Diseases Reported Present.‡	42	70	30	4.5	35	72	25	3.8	45	77	35	4.8	34	71	25	3.5	37	77	28	4.0	46	81	38	5.5
Bronchitis	71	73	52	3.9	66	81	54	3.0	85	92	79	3.5	63	78	50	3.1	78	89	69	2.8	80	90	73	3.6
Cerebro-spinal Meningitis	6	23	1	9.0	6	33	2	4.1	4	35	2	7.2	7	32	3	6.4	8	40	3	5.5	5	41	2	5.8
Cholera Infantum	31	55	18	5.8	15	54	8	6.4	24	61	15	6.3	15	36	5	3.8	14	48	7	5.9	21	69	14	6.5
Cholera Morbus	21	66	14	6.2	16	45	7	5.5	29	53	16	6.4	18	39	7	5.5	25	59	15	5.3	30	58	17	6.3
Consumption, Pulmonary	42	91	38	5.9	77	97	74	4.5	83	96	81	5.9	80	92	74	3.9	79	89	70	5.4	83	94	79	5.7
Croup, Membraneous	12	28	3	4.8	7	42	3	4.6	23	57	14	6.8	12	43	5	5.5	10	43	4	6.3	17	62	11	11.2
Diphtheria	37	65	24	5.9	41	72	29	4.4	51	62	31	6.1	34	52	17	3.7	28	60	17	4.6	44	62	27	7.5
Diarrhea	65	70	46	4.2	54	63	34	3.6	65	73	48	4.2	47	56	27	4.3	43	76	33	4.4	67	82	55	4.8
Dysentery	48	62	29	4.9	19	44	9	4.8	33	64	21	6.0	21	53	11	4.3	19	56	11	5.3	45	76	35	8.5
Erysipelas	35	47	16	5.2	26	44	12	4.7	42	65	28	6.6	27	63	17	5.5	26	58	15	6.2	44	78	35	8.7
Fever, Intermittent	85	83	71	2.6	89	89	79	2.0	96	95	91	1.6	98	88	87	2.0	95	92	88	2.0	94	90	86	2.3
Fever, Remittent	92	90	84	1.8	71	77	54	3.1	69	83	58	3.9	67	72	49	2.9	76	82	63	3.0	68	84	58	3.4
Fever, Typhoid (Enteric)	19	58	12	5.5	18	57	11	6.5	9	40	4	7.9	6	62	4	7.2	6	47	3	6.3	33	72	24	8.6
Fever, Typho-malarial	27	55	16	5.6	34	70	24	4.6	51	69	36	5.7	28	60	17	4.1	27	61	17	5.1	49	78	38	6.7
Influenza	67	73	49	3.1	40	71	28	2.8	66	79	53	3.8	55	75	41	2.7	44	76	33	3.0	79	83	65	3.2
Measles	4	63	2	2.0	3	33	1	4.3	5	50	3	5.0	1	50	1	4.0	1	25	1	6.0	13	82	11	8.9
Neuralgia ‡	10	62	6	6.0	5	71	3	3.2	19	82	17	4.1	17	55	9	4.8	19	68	13	4.5	12	70	8	5.1
Pneumonia	63	59	38	5.2	58	60	35	4.5	72	79	56	5.1	46	70	32	3.2	50	73	36	4.0	64	78	51	6.4
Puerperal Fever	8	59	5	9.0	16	44	7	5.8	6	3	2	6.8	2	44	1	4.0	4	36	1	7.4	4	30	1	5.0
Rheumatism	88	68	59	5.0	62	80	49	3.8	88	90	80	4.5	85	86	73	3.4	79	85	66	3.9	87	87	77	4.4
Scarlatina	48	65	31	6.2	29	63	19	3.8	56	62	34	5.6	31	46	14	4.1	28	60	16	5.7	43	80	34	7.2
Small-pox	0	0	0	0	3	28	1	3.0	1	20	.2	5.0	1	25	.3	3.0	0	0	0	0	1	25	.2	7.0
Tonsilitis ‡	10	40	4	7.6	8	54	5	3.4	18	75	14	4.7	18	57	10	3.5	22	70	15	4.0	13	67	9	5.7
Whooping-cough	23	76	18	5.7	27	72	19	3.9	22	71	15	5.1	12	61	8	2.7	28	75	22	4.2	45	86	39	5.9

*, b, c, d, e. See foot-notes with these marks on page 405. ‡ Tonsilitis and neuralgia are not included in the average, because not on blanks used before Oct. 1.

An attempt has been made to determine from Tables 2 and 3 the relative amount of sickness in 1878, from several of the leading diseases tabulated, in each of the six geographical divisions of the State from which the most reports were received. A table has been made, containing statements for each such division, similar to Table 2 for the State for the year on pages 404–5. This table is printed on page 472. From a comparison of statements in the several columns for each division in this table the names of the leading diseases have been arranged in order, those from which there seems to have been the most sickness being placed first. The result is as follows, in Exhibit B.

EXHIBIT B.—*By Geographical Divisions of the State, the Diseases from which there seems to have been the Greatest Amount of Sickness in 1878, as indicated by the Per Cent of Weekly Reports stating Presence of each of the Diseases, as studied in connection with the Average Order of Prevalence of said diseases when reported present.*

Order.	Diseases in order of apparent amount of sickness, most prevalent one first.	Per Cent of Reports Stating Presence of.[d]	Av. Order of Prevalence where Present.[e]	Diseases in order of apparent amount of sickness, most prevalent one first.	Per Cent of Reports Stating Presence of.[d]	Av. Order of Prevalence where Present.[e]	Diseases in order of apparent amount of sickness, most prevalent one first.	Per Cent of Reports Stating Presence of.[d]	Av. Order of Prevalence where Present.[e]
	Western Division.*			Central Division.*			Bay and Eastern Div.*		
1	Remittent fever	84	1.8	Intermittent fever	79	2.0	Intermittent fever	91	1.6
2	Intermittent fever	71	2.6	Consumption, pulm.	74	4.5	Bronchitis	79	3.5
3	Influenza	49	3.1	Bronchitis	54	3.0	Rheumatism	80	4.5
4	Bronchitis	52	3.9	Remittent fever	54	3.1	Consumption, pulm.	81	5.9
5	Rheumatism	59	5.0	Rheumatism	49	3.8	Remittent fever	58	3.9
6	Diarrhea	46	4.2	Diarrhea	34	3.6	Influenza	53	3.8
7	Pneumonia	38	5.2	Pneumonia	35	4.5	Pneumonia	56	5.1
	Consumption, pulm.	38	5.9	Influenza	28	2.8	Diarrhea	48	4.2
	Scarlatina	31	6.2	Diphtheria	29	4.4	Typho-malarial fever	36	5.7
	Av. of 22 Diseases	30	4.5	Av. of 22 Diseases	25	3.8	Av. of 22 Diseases	35	4.8
	South-Western Div.*			Southern-Central Div.*			South-Eastern Div.*		
1	Intermittent fever	87	2.0	Intermittent fever	88	2.0	Intermittent fever	86	2.3
2	Rheumatism	73	3.4	Bronchitis	69	2.8	Bronchitis	73	3.6
3	Consumption, pulm.	74	3.9	Rheumatism	66	3.9	Rheumatism	77	4.4
4	Remittent fever	49	2.9	Remittent fever	63	3.0	Consumption, pulm.	79	5.7
5	Bronchitis	50	3.1	Consumption, pulm.	70	5.4	Influenza	65	3.2
6	Influenza	41	2.7	Influenza	33	3.0	Remittent fever	58	3.4
7	Pneumonia	32	3.2	Pneumonia	36	4.0	Diarrhea	55	4.8
8	Diarrhea	27	4.3	Diarrhea	33	4.0	Pneumonia	51	6.4
9							Whooping-cough	39	5.9
10							Typho-malarial fever	38	6.7
	Av. of 22 Diseases	25	3.5	Av. of 22 Diseases	28	4.0	Av. of 22 Diseases	38	5.5

*, d, e. See foot-notes with these marks on page 405.

Exhibit 32, below, brings together from Table 2, for more convenient comparison and study in connection with the diagrams, statements of the per cent of reports for each month stating presence of each of the diseases tabulated. Graphic representations of statements in Exhibit 32 are given in Diagrams 1, 2, 3, and 4, pages 475, 490, 507, and 508.

EXHIBIT 32.—*Per Cent of Weekly Reports Stating Presence of Diseases Represented, for the Year and for each month of the Year 1878; also Average Per Cent for Diseases Reported Present,—Compiled from 3,211 Weekly Reports by 97 Health Officers of Cities and Regular Correspondents of the State Board of Health.*

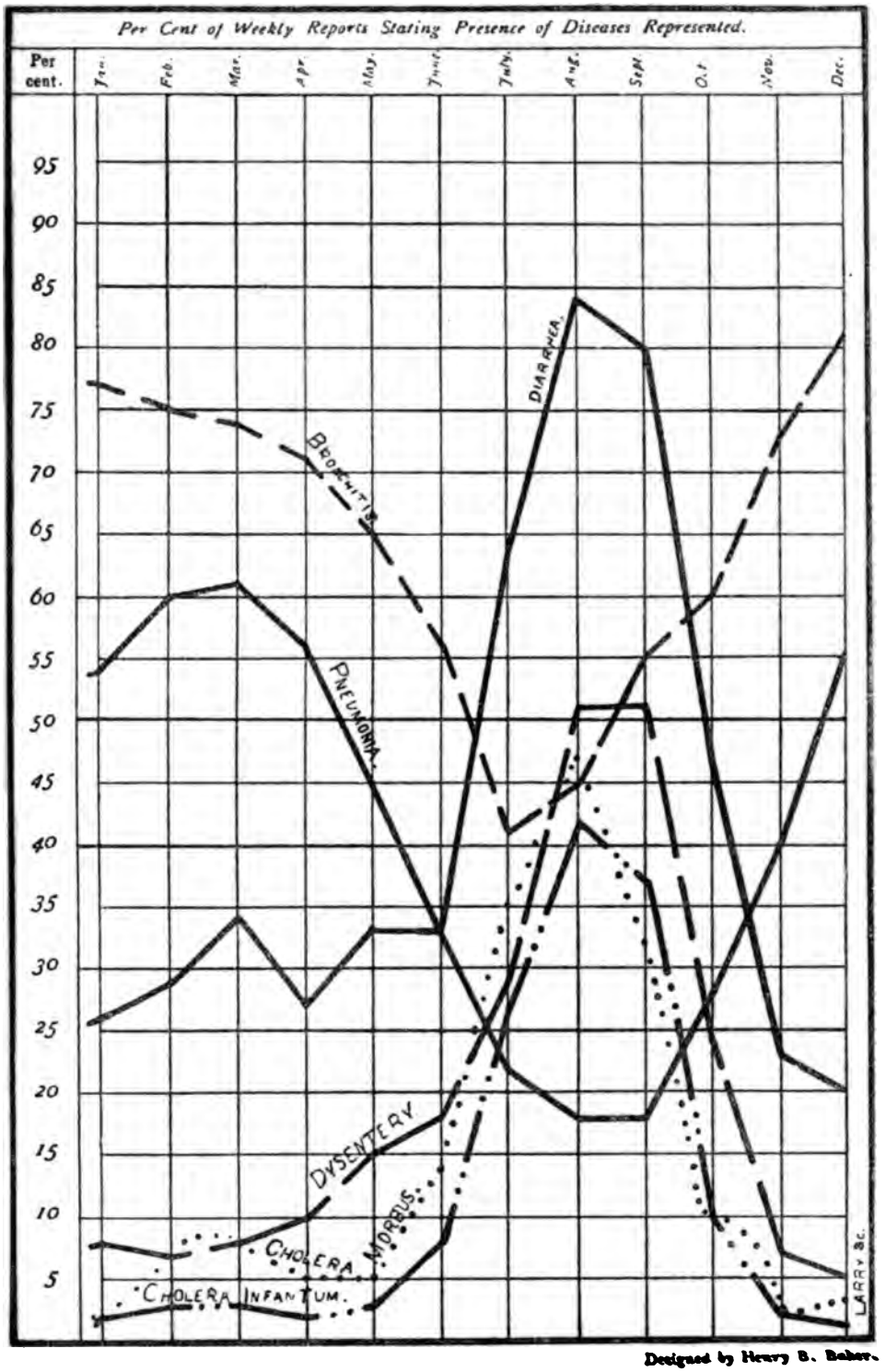
Order.*	Diseases.	Year 1878.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	Av. for Tabulated Diseases Reported Present	28	28	28	29	29	26	24	26	30	32	33	30	33
	Av. for Tabulated Diseases Reported Present, except Tonsilitis and Neuralgia	30	30	30	31	29	28	26	28	32	35	34	30	32
2	Bronchitis	64	77	75	74	71	65	56	41	45	55	60	73	81
---	Cerebro-spinal Meningitis	2	3	3	1	1	5	2	1	1	2	3	3	3
---	Cholera Infantum	11	2	3	3	2	3	8	27	42	37	10	2	1
---	Cholera Morbus	14	2	7	8	5	5	14	35	47	32	10	2	3
4	Consumption, Pulmonary	71	67	72	76	75	72	68	68	65	70	73	73	71
---	Croup, Membraneous	7	10	6	9	8	5	3	0.4	0.4	2	6	14	16
11	Diphtheria	23	30	24	23	22	14	12	12	16	19	27	35	40
7	Diarrhea	41	26	29	34	27	33	33	64	84	80	47	23	20
---	Dysentery	19	8	7	8	10	15	18	29	51	51	24	7	5
12	Erysipelas	21	23	23	22	21	18	19	16	20	16	26	25	26
1	Fever, Intermittent	82	69	66	74	83	91	92	90	91	92	90	80	68
---	Fever, Remittent	58	55	53	52	45	48	55	63	69	79	73	56	46
---	Fever, Typhoid (Enteric)	10	12	9	7	4	7	6	6	10	13	18	11	12
10	Fever, Typho-malarial	24	23	17	16	21	14	15	18	25	45	48	28	19
6	Influenza	44	49	52	52	54	46	37	27	24	38	41	50	57
---	Measles	5	5	4	4	3	4	5	6	5	2	3	5	7
---	Neuralgia	10	7	4	4	4	4	4	3	2	4	20	31	36
8	Pneumonia	41	54	60	61	56	45	33	22	18	18	28	40	55
---	Puerperal Fever	3	4	3	4	0.4	3	3	1	2	3	3	3	2
3	Rheumatism	68	75	75	77	75	67	65	57	51	56	65	67	79
9	Scarlatina	25	23	29	35	24	21	20	17	20	25	28	26	32
---	Small-pox	0.2	0	0	0	0	0	1	1	0.4	0.4	0	0.4	0
---	Tonsilitis	11	7	4	5	6	2	2	2	4	5	21	36	40
---	Whooping-cough	21	14	11	13	12	17	17	22	23	27	32	36	38

* Judging from the per cent of reports, in connection with the order of prevalence when present.

DIAGRAMS OF SICKNESS IN 1878.

Though statements of the "order of prevalence" of diseases based on the relative number of cases of the diseases reported are indefinite as to the actual amount of sickness from any or from all of the diseases, and averages of these statements are somewhat indefinite even as to the order of prevalence, or relative number of cases, it should be remembered that the statements in Exhibit 32, in the diagrams, and in the first figure-column of the tabular exhibits,

DIAGRAM No. 1 —DISEASES IN MICHIGAN, BY MONTHS IN 1878.



Designed by Henry B. Baker.

on following pages, relative to the prevalence of diseases represented, are of a different class, and indicate something absolute as to the time and area of prevalence of the diseases. Every report states concerning each disease on the list whether there has been a case of the disease during the week for which the report is made. The line for each disease in the diagrams states for each month what per cent the number of times the disease has been reported present is of the whole number of reports received for the month.

The height at which the irregular line representing the course of a disease crosses the perpendicular line representing a month indicates what per cent of reports stated that the disease was present at any time during the month. The per cents indicated at the heights of the several horizontal lines are denoted by the numbers in the left-hand margin of the diagrams, running by 5's from 5 per cent to 95 per cent. Other per cents indicated may easily be estimated from these, and are definitely stated for each disease in Exhibit 32, page 474.

Neuralgia and tonsilitis were not printed on the cards used previously to October 1, 1878, and not on all used after that date. It is probable, therefore, that they were not as fully reported, in localities where they occurred, before October 1, as afterwards, and that at no time during the year were the reports concerning them as complete as concerning the other diseases tabulated. Because of this probable inequality in the reports concerning neuralgia and tonsilitis these these two diseases have been excluded from the line, "Av. for tabulated diseases reported prevalent," in Tables 1 and 2, and from the diagrams. In Exhibit 32, page 474, however, two average lines are given for the "per cent of weekly reports stating prevalence of diseases represented," one excluding, the other including tonsilitis and neuralgia. It will be seen that the difference between these two lines is less after October 1 than before.

RELATIONS OF METEOROLOGICAL CONDITIONS TO CERTAIN DISEASES.

In order to facilitate a study of the relations of some of the leading diseases to given meteorological conditions, certain propositions have been framed concerning these relations, and the exceptions to these propositions have been noted, in order to learn in what proportion of cases the propositions hold true, and to ascertain, if possible, by a comparison of conditions, the causes of the exceptions.

One prominent meteorological condition, and that to which all the other conditions bear more or less direct relations, is the temperature. Many of the diseases studied may accordingly be classified as cold-weather or as warm-weather diseases. The propositions with regard to several of the diseases may be stated in a general way, as follows: That bronchitis, membraneous croup, diphtheria, influenza, pneumonia, and rheumatism are more than usually prevalent when the average temperature and the moisture of the atmosphere are lower or less than usual, and less prevalent when the temperature and moisture are higher than usual; that they are more prevalent when the ozone and the velocity of the wind are greater than usual, and less prevalent when the ozone and the velocity of the wind are less than usual; and that cholera infantum, diarrhea, and intermittent fever are more than usually prevalent when the average temperature and the moisture of the atmosphere are higher or greater than usual, and less prevalent when the temperature and moisture are lower than usual; that they are more than usually prevalent when the ozone and the velocity of the wind are less than

usual, and less prevalent when the ozone and the velocity of the wind are greater than usual.

These propositions at once suggest the question, By what standard shall we determine when the prevalence of a disease is "unusual," or when the temperature, humidity, ozone, or other condition is "unusually" high or "unusually" low? A good standard would probably be an average for the given month for a period of years. But as these observations of diseases have been made for only about two years it is yet impossible to obtain that. Another standard that may be used is the average prevalence of the disease, or the average for the given meteorological condition, for the year under consideration. In the preceding Report this has been taken for a standard, and it is here used in the preparation of tabular Exhibits 33–42, on following pages.

EXHIBITS OF DISEASES AND COINCIDENT METEOROLOGICAL CONDITIONS.

In the tabular exhibit relating to each disease thus studied, the months in which the prevalence of the given disease seems to have been greater than the average for the year are arranged, in order of prevalence, above the average line for the disease and for the conditions studied; those in which its prevalence seems to have been less than the average for the year are arranged in order below this line; the several meteorological conditions for each month are stated on the line with the month. The numbers stating meteorological conditions which seem to be exceptions to the propositions thus made are denoted in Exhibits 33–42, on following pages, by reference letters, *a*, *b*, *c*, etc., which refer to foot-notes containing more definite statements of the propositions. It will be seen that in some cases the difference from the average (either above or below) is but small, and that, therefore, the exception or the agreement has but little weight. Propositions have been made also concerning the average daily range of temperature, the monthly and the average daily range of atmospheric pressure, and the average atmospheric pressure and the prevalence of the same diseases; but concerning these conditions the relations to diseases do not seem to be so close as in case of the average temperature, humidity of the atmosphere, ozone, and velocity of the wind.

The distinction between the cold-weather and the warm-weather diseases is plainly exhibited in Diagram 1, which has been constructed with reference to this contrast. It will be seen that the lines for diarrhea, dysentery, cholera infantum, and cholera morbus follow closely the direction of the lines for average temperature, in Diagram I., page 345, while the lines for bronchitis and pneumonia take the opposite direction; and that there is, perhaps, even a closer correspondence (or a stronger contrast, as the case may be) between the course of these diseases and the lines for ozone, and for velocity of the wind, in Diagrams VI., VII., and VIII., pages 370, 373, and 375. Concerning the relation of wind and ozone to several of these diseases, something was said on pages 371 and 389.

A comparison of Diagram 1, which exhibits the contrast mentioned above, with the line in Diagram 4 which represents the average of twenty-two diseases, serves to show the importance of studying each of the diseases separately; for, notwithstanding the strongly-marked characters of several of the diseases included in that average, the divergencies in opposite directions tend to neutralize each other in such manner that the line for the average runs almost directly across the page.

In 1877 and 1878 pneumonia, influenza, and rheumatism reached their

lowest point in August, while diarrhea, cholera morbus, and cholera infantum reached their highest point in that same month; in 1877 bronchitis reached its lowest point in August, and in 1878 in July.

BRONCHITIS.

The average daily range of temperature is greatest, and great ranges seem to occur most frequently in the warm months. These are also months in which, for several reasons, diseases of the air-passages are least frequent.

By an examination of Exhibit 33, page 480, it may be seen that with the exception of April and May, that is in ten months of the twelve, the average temperature was lower than the average for the year in months when the per cent of reports stating presence of bronchitis was greater than the average for the year; and it was higher than the average in months when the per cent of reports was less than the average. The greater than average prevalence of bronchitis in April and May when the temperature was higher than the average, may perhaps be explained by the very high wind in April, the higher than average wind in May, the greater than the average quantity of ozone, and the greater than average range of temperature from day to day, in both months.

Except in April and May the average relative humidity of the air was greater than the average for the year in those months when the per cent of reports stating presence of bronchitis was greater than the average for the year.

The absolute humidity of the atmosphere was less than the average for the year in all months in which the per cent of reports stating presence of bronchitis was greater than the average for the year. Excepting October, the absolute humidity was greater than the average for the year in months when the per cent of reports was less than the average. It follows that with this one exception the quantity of vapor inhaled daily was less, and that the quantity exhaled daily in excess of that inhaled was greater, in months when more than the average per cent of reports stated presence of bronchitis; and that more vapor was inhaled, and a less excess exhaled in months when less bronchitis was reported.

Excepting November, the day and night ozone were more abundant than the average for the year, in months when the per cent of reports stating presence of bronchitis was greater than the average for the year. The exception for November may have been due to the low temperature in that month; but another explanation is suggested on page 481. In every month in which the per cent of reports stating the presence of bronchitis was less than the average for the year, the day and night ozone were less abundant than the average.

With some exceptions, bronchitis seemed to be more than usually prevalent in months when the monthly and the average daily range of atmospheric pressure were greater than the averages for the year. The disease seemed to have little connection with the average atmospheric pressure.

Though the evidence is not complete for the year, bronchitis was more prevalent in months when the average velocity of the wind was great, and less prevalent when the velocity of the wind was less than usual.

The observations of velocity of wind were made at the office of the State Board of Health, Lansing; the other conditions were observed under the direction of Prof. R. C. Kedzie at the Agricultural College, near Lansing, and near the center of the thickly settled part of the State. These observations are believed to supply data valuable for comparison with the records of sickness in the State.

EXHIBIT 33.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Bronchitis during the Year and during each Month of the Year 1878. Compared with some given Meteorological Conditions existing at the same time, at the State Agricultural College, near Lansing, Michigan, and near the Center of the thickly-settled part of the State.**, ††

Months in Order of Per Cent of Weekly Reports stating Presence of Bronchitis.	Per Cent of Weekly Reports stating Presence of Bronchitis.†	Av. Order of Prevalence where Present.†, ‡	Temperature. Degrees Fahr. Av. Range. Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	Temperature. Av. Range. During Day and Following Night, by registering Thermometers,—Obs'v'd at 7 A. M.	Temperature. Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Inches of Rain and Melted Snow.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily. Relative Humidity, or Per Cent of Saturation.	Humidity of Atmosphere. Absolute Humidity—Grs. of Vapor in a Cubic ft. of air.§	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Inhaled by one Person in 24 hours.‖	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Ozone,—Relative. Scale of 10 degrees of Coloration. Day Observation,—7 A. M. to 2 P. M.	Ozone,—Relative. Night Observation,—9 P. M. to 7 A. M.	Av. Velocity of the Wind, Miles per Hour,—By Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.) Range of Barometer. Monthly, and for Year.	Range of Barometer. Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
Year 1878..	64	3.3	**101°	**105°	48.29	31.99	78	3.69	2.31	9.37	3.50	3.42	§§ 5.1	1.276	.114	29.053
More than the Av. Per Cent of Bronchitis. Dec.	81	3.0	a7.90	a11.71	21.29	2.27	95	1.62	1.01	10.67	4.55	4.74	.....	1.062	.142	29.147
Jan..	77	2.9	a8.74	a12.02	29.11	1.12	89	1.82	1.14	10.54	3.74	4.48	5.7	h .709	.146	29.099
Feb..	75	2.6	14.55	a19.21	28.07	2.74	89	1.91	1.19	10.49	5.00	5.33	g 5.0	1.033	.123	j 29.028
Mar..	74	2.6	a12.06	a15.81	40.90	3.12	83	2.80	1.75	9.93	4.68	4.94	6.7	.942	.181	j 29.027
Nov	73	3.3	a11.57	a15.67	36.29	2.16	87	2.44	1.53	10.15	e3.17	f3.14	g 5.0	.904	.134	29.081
April	71	2.6	14.07	20.10	b50.55	3.76	c 69	3.51	2.19	9.49	4.37	4.53	6.8	.921	i .080	j 28.875
May	65	3.0	a13.08	21.45	b54.57	3.44	c 61	3.68	2.30	9.38	3.97	4.10	5.6	h .749	i .096	j 29.013
Average...	64	3.3	13.56	19 78	48.29	2.67	78	3.69	2.31	9.37	3.50	3.42	§§ 5.1	.802	.114	29.053
Less than the Av. Per Cent. Oct...	60	3.7	a15.77	a21.87	48.33	1.99	76	d3.38	2.11	9.57	2.71	1.97	g 6.2	.684	i .132	j 29.080
June	56	3.1	a15.80	a25.03	64.08	3.15	73	5.05	3.16	8.52	3.17	3.00	4.3	.677	.100	29.080
Sept.	55	4.4	a17.43	a24.40	63.15	3.43	78	5.18	3.24	8.44	2.23	1.60	4.8	h .903	.103	j 29.157
Aug.	45	5.0	a17.71	a27.74	70.15	1.85	74	6.06	3.79	7.89	2.32	1.52	3.1	.434	.065	29.010
July.	41	4.1	a14.29	a22.81	73.04	2.96	68	6.83	4.27	7.41	2.10	1.74	3.1	.611	.068	j 29.065

* Additional statements relative to meteorological conditions may be found in an article on the Principal Meteorological Conditions in Michigan in 1878, on pages 335–394 of this Report. Statements relative to the soil moisture and ground water, by months in 1878, are given in Exhibits 7 and 8, and in summary foot-notes on pages 173–5.

† Explanations of statements in these columns, and other statements relative to the prevalence, in 1878, of the disease under consideration, may be found in Tables 2, 3, and 4, pages 404–469, 472 of this Report, and also in Diagrams 1, 2, 3, and 4, page 475 and following pages.

‡ Small numbers, in this column, indicate great prevalence in the localities where the disease occurred, as compared with other diseases; and large numbers, a less prevalence. But see pages 397–399, 474.

§ Calculated from readings of dry-bulb and wet-bulb thermometers.

‖ Calculated for 18 respirations per minute, of 20 cubic inches of air each.

¶ Assuming the air exhaled to be saturated with vapor at the temperature of 98° F., in which case each cubic foot of air contains 18.69 grains of vapor, and 18 respirations per minute, of 20 cubic inches of air each, make 11.68 Troy ounces of vapor exhaled daily. No correction has been made for expansion of the air after it is inhaled.

[illegible] an average, but the extreme range for the year.

Of all the conditions studied in Exhibit 33, absolute humidity and ozone seem to have had the closest relations to bronchitis. It is worthy of notice that the two exceptions (for October and November) are both capable of explanation by the supposition that the effects of conditions in one month sometimes extend over somewhat into the succeeding month,—thus the effects of the warm, moist, and still air of September with its small quantity of ozone may have tended to lessen the bronchitis in the first part of October notwithstanding the humidity in October averaged a little less than for the year; the cool, dry, and windy atmosphere in October may have their effects apparent in the more than average bronchitis in November notwithstanding the ozone in that month was slightly less than the average for the year.

By Exhibit 37, on page 492, it may be seen that the statements of facts and the suggestions in the above paragraph are as applicable to influenza as to bronchitis, in 1878.

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†† The observations of the velocity of the wind were made at the office of the State Board of Health, Lansing.

§§ Average for the 11 months, January to November.

a Exceptions to the proposition that more than the average per cent of reports stated presence of bronchitis in months when the Average Daily Range of Temperature was greater than the average for the year; and less, in months when it was less than the average.

b Exceptions to the proposition that more than the average per cent of reports stated presence of bronchitis in months when the Average Daily Temperature was lower than the average for the year; and less, in months when it was higher than the average.

c Exceptions to the proposition that more than the average per cent of reports stated presence of bronchitis in months when the Relative Humidity of the atmosphere was greater than the average for the year; and less, in months when it was less than the average. In September the per cent of reports was less than the average and the relative humidity equal to the average for the year.

d An exception to the proposition that more than the average per cent of reports stated presence of bronchitis in months when the Absolute Humidity of the atmosphere was less than the average for the year; and less, in months when it was greater than the average. It follows that with this one exception the quantity of vapor inhaled daily was less, and that the amount exhaled daily in excess of that inhaled was greater, in months when more than the average per cent of reports stated presence of bronchitis; and that more vapor was inhaled, and a less excess exhaled, in months when less bronchitis was reported.

e An exception to the proposition that more than the average per cent of reports stated presence of bronchitis in months when the amount of Ozone in the atmosphere, as indicated by the Day observation, was greater than the average of day observations for the year; and less, in months when it was less than the average.

f An exception to the proposition that more than the average per cent of reports stated presence of bronchitis in months when the amount of Ozone in the atmosphere, as indicated by the Night observation, was greater than the average of night observations for the year; and less, in months when it was less than the average.

g Exceptions to the proposition that more than the average per cent of weekly reports stated presence of bronchitis in months when the average Velocity of the Wind was greater than the average for the eleven months, January to November; and less, when the velocity of the wind was less than the average.

h Exceptions to the proposition that more than the average per cent of reports stated presence of bronchitis in months when the Monthly Range of the Barometer was greater than the average monthly range for the year; and less, in months when it was less than the average.

i Exceptions to the proposition that more than the average per cent of reports stated presence of bronchitis in months when the Average Daily Range of the Barometer was greater than the average range for the year; and less, in months when it was less than the average.

j Exceptions to the proposition that more than the average per cent of reports stated presence of bronchitis in months when the Average Daily Pressure of the Atmosphere was greater than the average for the year; and less, in months when it was less than the average.

EXHIBIT 34.—PNEUMONIA.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Pneumonia, during the Year and during each Month of the Year 1878, Compared with some given Meteorological Conditions existing at the same time, at the State Agricultural College, near Lansing, Mich., and near the center of the thickly-settled part of the State.**, ††

Months in Order of Per Cent of Weekly Reports Stating Presence of Pneumonia.†	Per Cent of Weekly Reports Stating Presence of Pneumonia.†	Av. Order of Prevalence where Present.†, ‡	Temperature. Degrees Fahr. Range, Av. Daily, and for Year. Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and Following Night, by Registering Thermometers,—Obs'v'd at 7 A. M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Inches of Rain and Melted Snow.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily. Relative Humidity, or Per Cent of Saturation.	Absolute Humidity—Grs. of Vapor a Cubic ft. of Air.§	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Ozone,—Relative. Scale of 10 Degrees of Coloration. Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.	Average Velocity of Wind, Miles per Hour,—By Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.) Range of Barometer. Monthly, and for Year.	Average Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
Year 1878.	41	4.8	**101°	**105°	48.29	31.99	78	3.69	2·31	9.37	3.50	3.42	§§5.1	1.276	.114	29.053
More than the Av. Per Cent of Pneumonia. Mar.	61	3.8	a12.06	a15.81	40.90	3.12	83	2.80	1.75	9.93	4.68	4.94	6.7	.942	.181	j 29.027
Feb.	60	4.2	14.55	a19.21	28.07	2.74	89	1.91	1.19	10.49	5.00	5.33	g 5.0	1.033	.123	j 29.026
Apr.	56	4.2	14.07	20.10	b50.55	3.76	c 69	3.51	2.19	9.49	4.37	4.53	6.8	.921	i .080	j 28.875
Dec.	55	4.8	a 7.90	a11.71	21.29	2.27	95	1.62	1.01	10.67	4.55	4.74	.....	1.062	.142	29.147
Jan.	54	4.1	a 8.74	a12.02	29.11	1.12	89	1.82	1.14	10.54	3.74	4.48	5.7	h .709	.146	29.099
May	45	4.7	a13.08	21.45	b54.57	3.44	c 61	3.68	2.30	9.38	3.97	4.10	5.6	h .749	i .096	j 29.012
Average .	41	4.8	13.56	19.78	48.29	2.67	78	3.69	2.31	9.37	e3.50	f3.42	§§5.1	.802	.114	29.053
Less than the Av. Per Cent of Pneumonia. Nov.	40	5.1	11.57	15.67	b36.29	2.16	c 87	d2.44	1.53	10.15	3.17	3.14	5.0	h .904	i .134	j 29.061
June.	33	5.0	a15.80	a25.03	64.08	3.15	73	5.05	3.16	8.52	3.17	3.00	4.3	.677	.100	29.080
Oct.	28	6.3	a15.77	a21.87	48.33	1.99	76	d3.38	2.11	9.57	2.71	1.97	g 6.2	.684	i .132	j 29.080
July.	22	6.0	a14.29	a22.81	73.04	2.96	68	6.83	4.27	7.41	2.10	1.74	3.1	.611	.068	j 29.085
Sept.	18	6.8	a17.43	a24.40	63.15	3.43	78	5.18	3.24	8.44	2.23	1.60	4.8	h .903	.103	j 29.157
Aug.	18	7.2	a17.71	a27.74	70.15	1.85	74	6.06	3.79	7.89	2.32	1.52	3.1	.434	.065	29.010

*, †, ‡, §, ‖, ¶. See foot-notes with these marks in Exhibit 33, page 480.

** Not an average, but the extreme range for the year.

†† The observations of the velocity of the wind were made at the office of the State Board of Health, Lansing.

§§ Average for the 11 months January to November.

a Exceptions to the proposition that more than the average per cent of reports stated presence of pneumonia in months when the Average Daily Range of Temperature was greater than the average for the year; and less, in months when it was less than the average.

b Exceptions to the proposition that more than the average per cent of reports stated presence of pneumonia in months when the Average Daily Temperature was lower than the average for the year; and less, in months when it was higher than the average.

c Exceptions to the proposition that more than the average per cent of reports stated presence of pneumonia in months when the Relative Humidity of the atmosphere was greater than the average for the year; and less, in months when it was less than the average. In September the per cent of reports was less than the average and the relative humidity equal to the average for the year.

d There are two exceptions to the proposition that more than the average per cent of reports stated presence of pneumonia in months when the Absolute Humidity of the atmosphere was less

PNEUMONIA AND THE CONDITIONS OF THE AIR.

On pages 304–5 of last Report, for 1878, it may be seen that the meteorological conditions most closely related to pneumonia in 1877 were temperature, absolute humidity, and night ozone, and that the evidences of such relations were about as strong as they could be, the propositions holding true in twelve cases out of twelve. Inasmuch as there seems to be a tendency (not on the part of the writer) to distrust the reliability of observations on ozone by means of Schönbein's test paper, it is worthy of remark that of the three conditions mentioned above the only one which remained perfectly constant in its relations to pneumonia for 1878 as in 1877 was the ozone. The wind seems to have had a closer relation than did the temperature (possibly because wind brings ozone somewhat in proportion to its velocity?), the high wind in April being coincident with much pneumonia notwithstanding the temperature was a little higher than the average; but the high wind and dry air in October seem not to have prevailed over the small quantity of ozone, for the pneumonia was less than the average in October, and did not reach the average in the following month, though it may be that the warm moist air of September, which was comparatively free from ozone, had influence in reducing the sickness from pneumonia reported for the first part of October. And, again, the slight exception in February to the proposition as to the wind is apparently explained by the very excessive ozone in that month. On the other hand, the high winds in March and April seem to have had the effect to cause these months to rank higher in sickness from pneumonia than would be expected from an examination of the columns in the exhibit which relate to ozone. It is remarkable that, with these two exceptions which seem to be thus easily explained, the prevalence of night ozone is the same by months as the prevalence of pneumonia, so that the months arranged in order of amount of sickness from pneumonia are also in order of amount of ozone in the night air, the months of most sickness and most ozone first, March and April being exceptional, because of extraordinary wind, as just explained.

This disease may profitably be studied, for 1878, in Diagram 1, page 475, in

than the average for the year; and less, in months when it was greater than the average. It follows that, with these two exceptions, the quantity of vapor inhaled daily was less, and that the amount exhaled daily in excess of that inhaled was greater, in months when more than the average per cent of reports stated presence of pneumonia; and that more vapor was inhaled, and a less excess exhaled daily, in months when less pneumonia was reported.

e There is no exception to the proposition that more than the average per cent of reports stated presence of pneumonia in months when the amount of Ozone in the atmosphere, as indicated by the Day observations, was greater than the average of day observations for the year; and less, in months when it was less than the average.

f There is no exception to the proposition that more than the average per cent of reports stated presence of pneumonia in months when the amount of Ozone in the atmosphere, as indicated by the Night observation, was greater than the average of night observations for the year; and less, in months when it was less than the average.

g Exceptions to the proposition that more than the average per cent of reports stated presence of pneumonia in months when the average Velocity of the Wind was greater than the average for the 11 months Jan. to Nov., and less when the velocity of the wind was less than the average.

h Exceptions to the proposition that more than the average per cent of reports stated presence of pneumonia in months when the Monthly Range of the Barometer was greater than the average monthly range for the year; and less, in months when it was less than the average.

i Exceptions to the proposition that more than the average per cent of reports stated presence of pneumonia in months when the Average Daily Range of the Barometer was greater than the average range for the year; and less, in months when it was less than the average.

j Exceptions to the proposition that more than the average per cent of reports stated presence of pneumonia in months when the Average Daily Pressure of the Atmosphere was greater than the average for the year; and less, in months when it was less than the average.

connection with Diagrams I., II., VI., VII., and VIII., on pages 345, 352, 370, 373, and 375, which exhibit several meteorological conditions which seem to have close relations to pneumonia. On pages 471 and 473, the relative prevalence of pneumonia compared with other diseases is shown.

EXHIBIT 35.—MEMBRANEOUS CROUP.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Membraneous Croup, during the Year and during each Month of the Year 1878, Compared with some given Meteorological Conditions existing at the same time, at the State Agricultural College, near Lansing, Michigan, and near the center of the thickly-settled part of the State.**, ††

Months in Order of Per Cent of Weekly Reports Stating Presence of Membraneous Croup.†	Per Cent of Weekly Reports Stating Presence of Membraneous Croup.†	Av. Order of Prevalence where Present.†,‡	Temperature. Degrees Fahr. Av. Range. Of Observations at 7 A. M., 2 P. M., and 9 P. M. Daily.	Temperature. Av. Range. During Day and Following Night, by Registering Thermometers,—Obs'v'd at 7 A. M.	Temperature. Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Inches of Rain and Melted Snow.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily. Relative Humidity, or Per Cent of Saturation.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily. Absolute Humidity,—Grs. of Vapor in a Cubic ft. of Air.§	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in excess of Vapor Inhaled.¶	Ozone,—Relative. Scale of 10 Degrees of Coloration. Day Observation,—7 A. M. to 2 P. M.	Ozone,—Relative. Scale of 10 Degrees of Coloration. Night Observation,—9 P. M. to 7 A. M.	Average Velocity of Wind, Miles per Hour, by Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. Corrected for Temperature.—Reduced to 32° F. Range of Barometer. Monthly, and for Year.	Pressure of Atmosphere. Range of Barometer. Average Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Pressure of Atmosphere. Average Pressure.
Year 1878.	7	7.1	**101°	**105°	48.29	31.99	78	3.69	2.31	9.37	3.50	3.42	§§5.1	1.276	.114	29.053
More than the Av. Per Cent of Croup. Dec..	16	8.6	*a* 7.90	*a*11.71	21.29	2.27	95	1.62	1.01	10.67	4.55	4.74	.....	1.062	.142	29.147
Nov..	14	7.9	*a*11.57	*a*15.67	36.29	2.16	87	2.44	1.53	10.15	*e*3.17	*f*3.14	*g* 5.0	.904	.134	29.081
Jan..	10	5.6	*a* 8.74	*a*12.02	29.11	1.12	89	1.82	1.14	10.54	3.74	4.48	5.7	*h* .709	.146	29.039
Mar.	9	6.8	*a*12.06	*a*15.81	40.90	3.12	83	2.80	1.75	9.93	4.68	4.94	6.7	.942	.181	*j* 29.027
Apr.	8	7.5	14.07	20.10	*b*50.55	3.76	*c* 69	3.51	2.19	9.49	4.37	4.53	6.8	.921	*i* .080	*j* 28.875
Average..	7	7.1	13.56	19.78	48.29	2.67	78	3.69	2.31	9.37	3.50	3.42	§§5.1	.802	.114	29.053
Less than the Av. Per Cent of Croup. Feb..	6	7.4	*a*14.55	19.21	*b*28.07	2.74	*c* 89	*d*1.91	1.19	10.49	*e*5.00	*f*5.33	5.0	*h*1.033	*i* .123	29.026
Oct..	6	6.9	*a*15.77	*a*21.87	48.33	1.99	76	*d*3.38	2.11	9.57	2.71	1.97	*g* 6.2	.684	*i* .132	*j* 29.080
May.	5	7.2	13.08	*a*21.45	54.57	3.44	61	*d*3.68	2.30	9.38	*e*3.97	*f*4.10	*g* 5.6	.749	.096	29.013
June	3	6.3	*a*15.80	*a*25.03	64.08	3.15	73	5.05	3.16	8.52	3.17	3.00	4.3	.677	.100	29.030
Sept.	2	6.3	*a*17.43	*a*24.40	63.15	3.43	78	5.18	3.24	8.44	2.23	1.60	4.8	*h* .903	.103	*j* 29.157
Aug.	0.4	1.0	*a*17.71	*a*27.74	70.15	1.85	74	6.06	3.79	7.89	2.32	1.52	3.1	.434	.065	29.010
July.	0.4	3.0	*a*14.29	*a*22.81	73.04	2.96	68	6.83	4.27	7.41	2.10	1.74	3.1	.611	.068	*j* 29.085

*, †, ‡, §, ‖, ¶. See foot-notes with these marks in Exhibit 33, pages 480-1.

** Not an average, but the extreme range for the year.

†† The observations of the velocity of the wind were made at the office of the State Board of Health, Lansing.

§§ Average for the 11 months, January to November.

a Exceptions to the proposition that more than the average per cent of reports stated presence of membraneous croup in months when the Average Daily Range of Temperature was greater than the average for the year; and less, in months when it was less than the average.

b Exceptions to the proposition that more than the average per cent of reports stated presence of membraneous croup in months when the Average Daily Temperature was lower than the average for the year; and less, in months when it was higher than the average.

CROUP, MEMBRANEOUS CROUP, AND CONDITIONS OF THE AIR.

In compiling and studying the Vital Statistics of Michigan, the writer has found the relations of deaths from croup to meteorological conditions to differ very considerably from the relations of deaths from diphtheria to those same conditions. In the vital-statistics returns it is not practicable to study separately the deaths from membraneous croup. Having these facts in mind, the blanks for weekly reports of diseases were planned to secure reports of sickness from membraneous croup, leaving spasmodic croup to be written on the card-report by the observer wherever the disease should appear. Very little sickness from spasmodic croup has been reported. Exhibit 35 relates to sickness from membraneous croup, and a comparison of it with Exhibit 36, relative to sickness from diphtheria, does not reveal as much difference as was found by a similar comparison between deaths from croup and diphtheria where the croup was not limited to the membraneous variety, in which case the relations of cold, dry, and highly ozonized air were much closer to deaths from croup than to deaths from diphtheria. By Exhibits 35 and 36 it may be seen that the relations of such conditions to sickness from both membraneous croup and diphtheria are close, the several propositions holding true in from eight to eleven cases out of twelve.

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c Exceptions to the proposition that more than the average per cent of reports stated presence of membraneous croup in months when the Relative Humidity of the atmosphere was greater than the average for the year; and less, in months when it was less than the average.

d Exceptions to the proposition that more than the average per cent of reports stated presence of membraneous croup in months when the Absolute Humidity of the atmosphere was less than the average for the year; and less, in months when it was greater than the average. It follows that, with these exceptions, the quantity of vapor inhaled daily was less, and that the amount exhaled daily in excess of that inhaled was greater, in months when more than the average per cent of reports stated presence of membraneous croup; and that more vapor was inhaled, and a less excess exhaled daily, in months when less membraneous croup was reported.

e Exceptions to the proposition that more than the average per cent of reports stated presence of membraneous croup in months when the amount of Ozone in the atmosphere, as indicated by the Day observation, was greater than the average of day observations for the year; and less, in months when it was less than the average.

f Exceptions to the proposition that more than the average per cent of reports stated presence of membraneous croup in months when the amount of Ozone in the atmosphere, as indicated by the night observation, was greater than the average of night observations for the year; and less, in months when it was less than the average.

g Exceptions to the proposition that more than the average per cent of reports stated presence of membraneous croup in months when the Average Velocity of the Wind was greater than the average for the 11 months, Jan. to Nov.; and less, in months when the velocity of the wind was less, than the average.

h Exceptions to the proposition that more than the average per cent of reports stated presence of membraneous croup in months when the Monthly Range of the Barometer was greater than the average monthly range for the year; and less, in months when it was less than the average.

i Exceptions to the proposition that more than the average per cent of reports stated presence of membraneous croup in months when the Average Daily Range of the Barometer was greater than the average range for the year; and less, in months when it was less than the average.

j Exceptions to the proposition that more than the average per cent of reports stated presence of membraneous croup in months when the Average Daily Pressure of the Atmosphere was greater than the average for the year; and less, in months when it was less than the average.

EXHIBIT 36.—DIPHTHERIA.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Diphtheria, during the Year and during each Month of the Year 1878, Compared with some given Meteorological Conditions existing at the same time, as Observed and Recorded at the State Agricultural College, near Lansing, Michigan, and near the center of the thickly-settled part of the State.**, ††.

Months in Order of Per Cent of Weekly Reports Stating Presence of Diphtheria.†	Per Cent of Weekly Reports Stating Presence of Diphtheria.†	Av. Order of Prevalence where Present.‡, ††	Temperature. Degrees Fahr. Av. Range. Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	Av. Range. During Day and Following Night, by Registering Thermometers,—Obs'v'd at 7 A. M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Inches of Rain and Melted Snow.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily. Relative Humidity, or Per Cent of Saturation.	Absolute Humidity—Grs. of Vapor in a Cubic ft. of Air.§	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Ozone,—Relative. Scale of 10 Degrees of Coloration. Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.	Av. Velocity of Wind, Miles per Hour,—By Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.) Range of Barometer. Monthly, and for Year.	Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
Year 1878..	23	5.4	**101°	**105°	48.29	31.99	78	3.69	2.31	9.37	3.50	3.42	§§5.1	1.276	.114	29.053
More than the Av. Per Cent of Diphtheria. Dec...	40	5.2	*a* 7.90	*a*11.71	21.29	2.27	95	1.62	1.01	10.67	4.55	4.74	.....	1.062	.142	29.147
Nov. .	35	5.5	*a*11.57	*a*15.67	36.29	2.16	87	2.44	1.53	10.15	*e*3.17	*f*3.14	*g* 5.0	.904	.134	29.081
Jan. ..	30	4.9	*a* 8.74	*a*12.02	29.11	1.12	89	1.82	1.14	10.54	3.74	4.48	5.7	*h* .709	.146	29.099
Oct. ..	27	5.5	15.77	21.87	*b*48.33	1.99	*c* 76	3.38	2.11	9.57	*e*2.71	*f*1 97	6.2	*h* .684	.132	29.080
Feb...	24	4.7	14.55	*a*19.21	28.07	2.74	89	1.91	1.19	10.49	5.00	5.33	*g* 5.0	1.033	.123	*j* 29.026
Mar...	23	5.6	*a*12.06	*a*15.81	40.90	3.12	83	2.80	1.75	9.93	4 68	4.94	6.7	.942	.181	*j* 29.027
Average ..	23	5.4	13.56	19.78	48.29	2.67	78	3.69	2.31	9.37	3.50	3.42	§§5.1	.802	*i* .114	29.053
Less than the Av. Per Cent of Diphtheria. Apr...	22	6.5	14.07	20.10	50.55	3.76	69	*d*3.51	2.19	9.49	*e*4.37	*f*4.53	*g* 6.8	*h* .921	.080	28.875
Sept...	19	4.7	17.43	24.40	63.15	3.43	78	5.18	3.24	8.44	2.23	1.60	4.8	*h* .903	.103	*j* 29.157
Aug...	16	5.6	17.71	27.74	70.15	1.85	74	6.06	3.79	7.89	2.32	1.52	3.1	.434	.065	29.010
May..	14	6.9	*a*13.08	21.45	54.57	3.44	61	*d*3.68	2.30	9.38	*e*3.97	*f*4.10	*g* 5.6	.749	.096	29 013
July..	12	4.5	14.29	22.81	73.04	2.96	68	6.83	4.27	7.41	2.10	1.74	3.1	.611	.068	*j* 29.085
June..	12	5.4	15.80	25.03	64.08	3.15	73	5.05	3.16	8.52	3.17	3 00	4.3	.677	.100	29.030

*, †, ‡, §, ‖, ¶. See foot-notes, with these marks, in Exhibit 33, pages 480-1.

** Not an average, but the extreme range for the year.

†† The observations of the velocity of the wind were made at the office of the State Board of Health, Lansing.

§§ Average for the 11 months, January to November, inclusive.

a Exceptions to the proposition that more than the average per cent of reports stated presence of diphtheria in months when the Average Daily Range of Temperature was greater than the average for the year; and less, in months when it was less than the average.

b There is but one exception to the proposition that more than the average per cent of reports stated presence of diphtheria in months when the Average Daily Temperature was lower than the average for the year; and less, in months when it was higher than the average.

c An exception to the proposition that more than the average per cent of reports stated presence of diphtheria in months when the Relative Humidity of the atmosphere was greater than the average for the year; and less, in months when it was less than the average.

d Exceptions to the proposition that more than the average per cent of reports stated presence of diphtheria in months when the Absolute Humidity of the atmosphere was less than the average for the year; and less, in months when it was greater than the average. It follows that, with these

THE CAUSATION OF DIPHTHERIA.

On pages 105–131 and 164–7 may be found data relative to diphtheria, which may well be studied in connection with Exhibit 36, on the page opposite this, and with Diagram 2, page 490. Comments on the relations of diphtheria to membraneous croup and to meteorological conditions are given on page 485.

As stated on page 167, it is probable that influenza by its irritation of the air-passages prepares for the reception of the contagium of both diphtheria and scarlet fever, and thus tends to make these diseases more prevalent in cold weather. It is also probable that during an epidemic of diphtheria many mild cases of diphtheria, in adults and even in children, from their very mildness are not recognized as diphtheria but pass as an influenza, a mere cold, or headache, or sore throat.

As the contagiousness of diphtheria is sometimes denied on the ground that more than one case seldom occurs in a family, though there may be several children in the family, it has been thought best to bring together some of the statements received at this office which tend to show that several cases in the same family are a common occurrence, though some of them, especially with adults, may be so mild as to attract but little attention, often not requiring medical treatment. The subject is of the greater importance from the fact that by these mild cases the disease is often communicated to those who have it severely and even fatally; and the statements here given are the more valuable in that they are made by men whose attention had probably not been especially called to this point.

DIPHTHERIA, MILD CASES ARE FREQUENT IN CONNECTION WITH SEVERE ONES, AND COMMUNICATE THE DISEASE,—COMMUNICATION FROM G. W. TOPPING, M. D., OF DE WITT, MICH.

Secretary State Board Health:

DEAR SIR:—I am now having the largest number of cases of genuine diphtheria which I have ever had at a time. I have had 10 cases in the township of Riley, about five miles N. W. of here; one case in Watertown, which I lost this morning, after an illness of 48 hours; and two cases in Olive, five miles N. E. of here.

In some of the families where I am now attending cases of diphtheria, other members of the family have had sore throat prior to my being called, and either treated them themselves or procured

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two exceptions, the quantity of vapor inhaled daily was less, and that the amount exhaled daily in excess of that inhaled was greater, in months when more than the average per cent of reports stated presence of diphtheria; and that more vapor was inhaled, and a less excess exhaled daily, in months when less diphtheria was reported.

e Exceptions to the proposition that more than the average per cent of reports stated presence of diphtheria in months when the amount of Ozone in the atmosphere, as indicated by the Day observations, was greater than the average of day observations for the year; and less, in months when it was less than the average.

f Exceptions to the proposition that more than the average per cent of reports stated presence of diphtheria in months when the amount of Ozone in the atmosphere, as indicated by the Night observation, was greater than the average of night observations for the year; and less, in months when it was less than the average.

g Exceptions to the propositions that more than the average per cent of reports stated presence of diphtheria in months when the average Velocity of the Wind was greater than the average for the 11 months Jan. to Nov.; and less, in months when the velocity of the wind was less than the average.

h Exceptions to the proposition that more than the average per cent of reports stated presence of diphtheria in months when the Monthly Range of the Barometer was greater than the average monthly range for the year; and less, in months when it was less than the average.

i There is no exception to the proposition that more than the average per cent of reports stated presence of diphtheria in months when the Average Daily Range of the Barometer was greater than the average range for the year; and less, in months when it was less than the average.

j Exceptions to the proposition that more than the average per cent of reports stated presence of diphtheria in months when the Average Daily Pressure of the Atmosphere was greater than the average for the year; and less, in months when it was less than the average.

medicines for them at my office on my perscription without seeing them, and they now present evidence of having had diphtheria, such as difficulty in swallowing fluids, choking, flowing back of liquids through the nose, and sometimes light diphtheritic patches upon tonsils and fauces, though they are able to be about and out of doors. Most of these last cases have been treated as tonsilitis.

In the families where it prevails but few of the children escape it, though some have it mildly and are scarcely confined indoors with it.

Four of the cases now on hand are dangerously sick, and have thick and dark diphtheritic membranes on their throats. I have removed some membranes which were partly detached, but they are quickly reproduced.

A few who are considered as convalescent, but still have traces of diphtheritic membranes upon their tonsils, persist in going out among their neighbors in spite of my warnings of the danger of such conduct. If it continues to spread I will inform you of the fact.*

Very respectfully yours,

G. W. TOPPING.

De Witt, Clinton Co., Mich., July, 1878.

A SEVERE CASE OF DIPHTHERIA APPARENTLY DERIVED FROM A MILD CASE IN THE SAME FAMILY,—COMMUNICATION FROM ROBERT JOHNSTON, M. D., OF MILFORD, MICH.

Secretary State Board of Health:

DEAR DOCTOR:—In regard to Myra Leonard's death (who died of diphtheria in Highland township, five miles north of this village, Jan. 4, 1879), I would state that an older sister was recovering from the disease at the time Myra (aet. 10) was taken sick. The older sister (12 years old) had the disease in a mild form, was not treated by a physician.

Myra was taken December 24, 1878. I saw her first December 27. The exudation then covered all the mucous membrane that could be seen in the pharynx, mouth, and nasal cavities, and was the most extensive I have seen in any case. The cervical and submaxillary glands were very much swollen, and the breath very offensive.

I saw her last January 1, 1879. The exudation was nearly all thrown off, and she appeared convalescent; she was sitting up in a chair, complained of nausea at times, but had a fair appetite for one in her condition. She continued to improve until 8 A. M., the 4th of January, 1879, when she suddenly "gasped for breath" while sitting by the window in a chair, and leaned back dead. She had rested well all night, had taken breakfast, and to all appearances was doing well until a *few seconds* before death. There had been no reason to believe that the larynx had been invaded when I last saw her. I am sure there was no laryngeal trouble, unless from paralysis of muscles. I presume it is only another illustration of the "liability to sudden death" which always should be remembered in giving a prognosis in a case of diphtheria. Perhaps she died of muscular debility, or paralysis affecting the heart.

There were three other children in the same rooms when I was first called. I had them sent away, and but one of them had the disease, and that case was mild.

The case "Irving Riley," mentioned in my report, died of diphtheritic croup. No operation was permitted, although recommended.

Respectfully,

Milford, Mich., March 15, 1879.

ROBERT JOHNSTON.

CONTAGIOUSNESS OF DIPHTHERIA,—COMMUNICATION FROM A. J. SAWYER, M. D., OF MONROE, MICH.

MY DEAR DOCTOR:—We are having some diphtheria in this county, and I have great difficulty in convincing the people that it is contagious. I was called into Bedford township, some 12 or 13 miles south of here, a short time since to see a child suffering from this fearful disease and very far gone with it, which died some six hours afterwards. I found no less than 17 persons in the room, with others constantly coming and going. I made the crowd and neighbors mad by clearing the room, sending them home, and requesting them to stay there.

Yesterday I was called to the nearest house on one side, where lay *one dead* child and three others down with it. One also died in the first house on the other side of the first house. Notwithstanding all this, one at least of the medical attendants who preceded me still insists that the disease is not contagious, and the people were going to have a funeral at the church to-day. I happened to have one of your pamphlets on the Restriction of Diphtheria with me, which I left with them and then said, "You have therein the testimony of the State Board of Health, *every word* of which I endorse, and you have the opinion of Dr. —— on the other side. Now in view of this and that so many have died here from the disease, you can choose between them."

But what I mostly write for is to know whether you will send me a few *more copies* of your paper on the Restriction of Diphtheria. The masses, and I am sorry to say, the profession too, need *re-educating* on this point, or the people will half of them die of this disease.

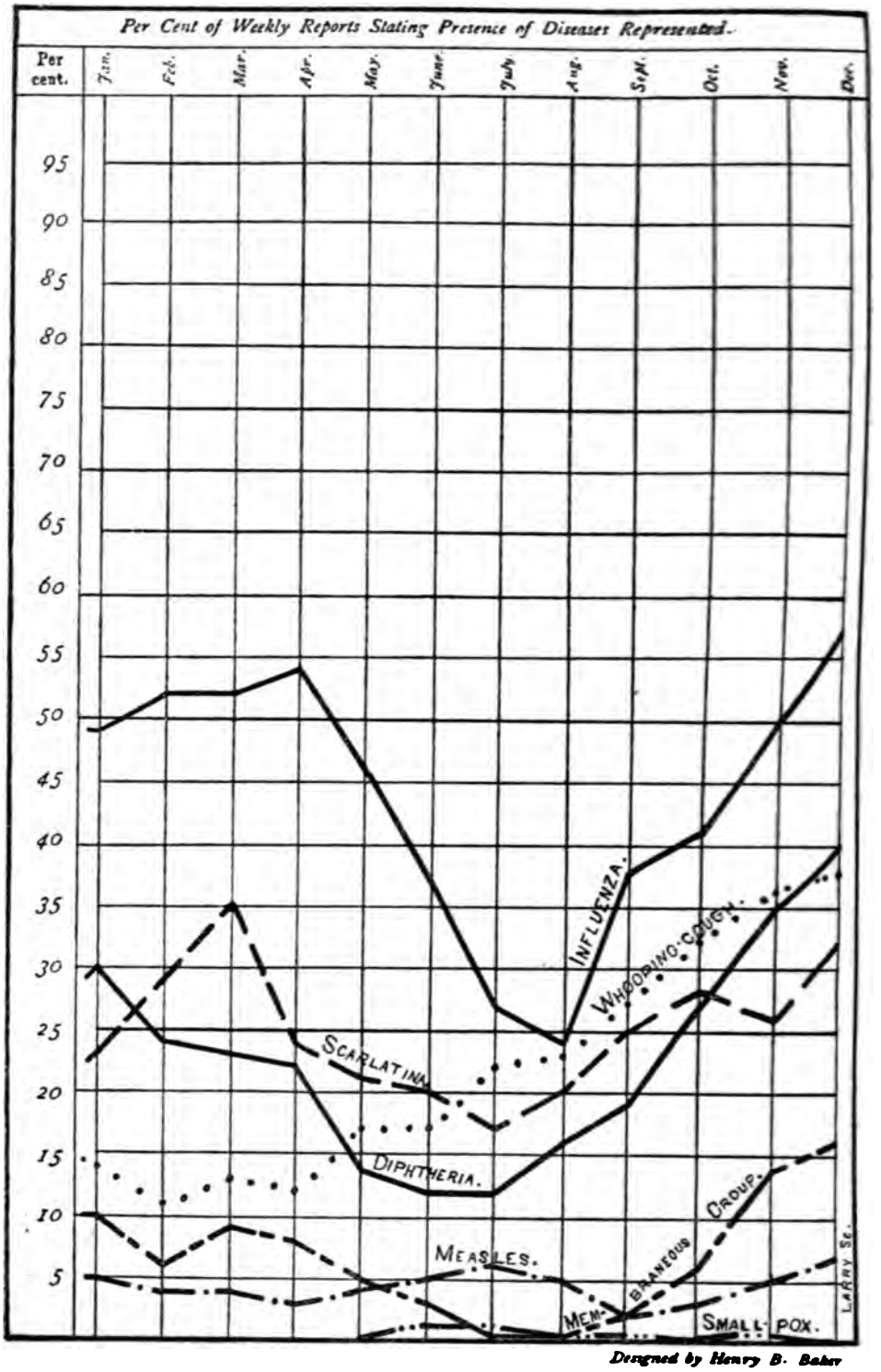
As ever, sincerely,

Monroe, Mich., Dec. 4, 1878.

A. J. SAWYER.

*[A fuller report of this epidemic is on page 85 of the Report of the State Board of Health for 1878.]

DIAGRAM No. 2.—DISEASES IN MICHIGAN, BY MONTHS IN 1878.



Designed by Henry B. Baker

Some of the communications which attribute cases of diphtheria to the use of bad water, also point to the possibility of their being derived by contagion from previous cases. In the following communication from Dr. Kitchen, of one of the families in which diphtheria occurred and which used the condemned water, it is stated that they "*have had the disease* in it [the family] *every year for three years.*" Thus it may have been derived from an infected well, or there may have been infected material in the house ever since the first case.

CASES OF DIPHTHERIA ASSOCIATED WITH USE OF BAD WATER,—COMMUNICATION FROM SAMUEL KITCHEN, M. D., OF EAST SAGINAW, MICH.

DEAR SIR:—I have the honor to report a few cases of diphtheria in this city within the last three weeks,—two cases in one family, and three in another, one of the former fatal. The cause is as usual, contaminated well-water. The first of the two families have a badly-kept lot, with a stable for a horse and cow, a privy, and a well all rather close to each other, the lot wet with a good deal of water standing on it; and undoubtedly a good deal of the filth found its way into the well. The other family have had the disease in it every year for three years, and the house is one of half a dozen standing close together, with well and two or three privies close together; and this family is the only one using water from this well. These cases were all attended by one physician, from whom I have this information. I am very truly yours,

East Saginaw, Mich., April 22, 1878. SAMUEL KITCHEN.

In the following letter by Dr. Lee, it is worthy of notice that mention is made of a case of diphtheria "across the street" from the one where the bad water was used. In a communicable disease like diphtheria, it is difficult to determine the influence of bad sanitary conditions; there is great need of a sanitary survey which shall give us knowledge of the conditions where diphtheria does not prevail, so that some comparison can be made with other localities where it prevails, or with the same localities when an outbreak of the disease occurs.

OTHER MILD CASES, AND CASES OF DIPHTHERITIC SORE THROAT ASSOCIATED WITH USE OF BAD WATER,—COMMUNICATION FROM N. D. LEE, M. D., OF SAGINAW CITY, MICH.

DEAR DOCTOR:—On February 1st I was called to see a German child, a girl five years old. The child, her mother says, has always been rather sickly. I found that the day before she had had slight chills, followed with very high fever, which was on when I visited her, about 2 o'clock P. M. Her pulse then was so rapid I could hardly count it, about one hundred and fifty, as near as I could count, small and short. I examined her throat and found it very much inflamed, but no diphtheria deposit yet; but I pronounced it to be diphtheria, and prescribed for that, and congestion of the kidneys; she is very much better to-day, urine normal in color. A few weeks since they lost a child; their physician, a German, called it that kind of croup that *cannot be cured.* I had a little patient across the street, at the same time, with diphtheria, and I presume, from all that I can learn from the mother and others, that this child died of diphtheria. The mother said that they had all been more or less sick since the child died, and that she now had a sore throat herself. I then examined her throat and found it very much inflamed, and tonsils swollen, with a gray spot about one-third of an inch in diameter on the side of the right tonsil; she was but very little feverish. I prescribed for her, for diphtheria. She is now better. I then asked them if they had seen anything in their well-water. They said they had, for some time, seen little worms in it, and she dipped up a glass of water out of the pail that had just been brought in. In that glass was an ash-colored worm, nearly a half inch long when quiet, and nearly one inch long when crawling, and it looked whiter than when quiet. The head end was somewhat blunt, or square off, with a white sucker-looking mouth, and as near as I could tell with my naked eye, it tapered both ways, from the center, and ended with a sharp pointed tail. I had them stop using the water, of course.

Respectfully yours,

Saginaw City, Feb. 2, 1878. N. D. LEE, M. D., *City Physician.*

The foregoing letters were received before the adoption of the plan of referring such communications to a committee. Much more on the subject of diphtheria may be found on pages 105–131, in this Report.

INFLUENZA.

The per cent of weekly reports stating presence of influenza in 1878 was greater than the average for the year in every month in which the average temperature was lower than the average for the year, and less than the average

in every month, except April and May, in which the average temperature was higher than the average for the year. The per cent of reports stating presence of influenza was greater than the average in every month, except October, in which the absolute humidity of the atmosphere was less than the average for the year, and less than the average in every month in which the absolute humidity of the atmosphere was greater than the average for the year. It was greater than the average in every month in which the ozone was more abundant than the average for the year, and less than the average in every month, except November, in which the ozone was less abundant than the average for the year. The foregoing comparisons are facilitated by a study of Exhibit 37.

EXHIBIT 37.—INFLUENZA.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Influenza, during the Year and during each Month of the Year 1878, Compared with some given Meteorological Conditions existing at the same time, at the State Agricultural College, near Lansing, Michigan, and near the Center of the thickly-settled part of the State.**, ††

Months in Order of Per Cent of Weekly Reports Stating Presence of Influenza.†	Per Cent of Weekly Reports Stating Presence of Influenza.†	Av. Order of Prevalence where Present.‡,‡‡	Temperature. Degrees Fahr. Av. Range. Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	Temperature. Av. Range. During Day and Following Night, by Registering Thermometers,—Obs'v'd at 7 A. M.	Temperature. Av. Range. Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Inches of Rain and Melted Snow.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily. Relative Humidity, or Per Cent of Saturation.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily. Absolute Humidity,—Grs. of Vapor in a Cubic ft. of Air.§	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Ozone,—Relative. Scale of 10 Degrees of Coloration. Day Observation,—7 A. M. to 2 P. M.	Ozone,—Relative. Scale of 10 Degrees of Coloration. Night Observation,—9 P. M. to 7 A. M.	Average Velocity of Wind, Miles per Hour,—By Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.) Range of Barometer. Monthly, and for Year.	Pressure of Atmosphere. Range of Barometer. Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Pressure of Atmosphere. Average Pressure.
Year 1878..	44	3.1	**101°	**105°	48.29	31.99	78	3.69	2.31	9.37	3.50	3.42	§§5.1	1.276	.114	29.053
More than the Av. Per Cent of Influenza. Dec..	57	2.7	*a* 7.90	*a*11.71	21.29	2.27	95	1.62	1.01	10.67	4.55	4.74	.....	1.062	.142	29.147
Apr.	54	2.9	14.07	20.10	*b*50.55	3.76	*c* 69	3.51	2.19	9.49	4.37	4.53	6.8	.921	*i* .080	*j* 28.875
Mar.	52	2.7	*a*12.06	*a*15.81	40.90	3.12	83	2.80	1.75	9.93	4.68	4.94	6.7	.942	.181	*j* 29.027
Feb..	52	2.4	14.55	*a*19.21	28.07	2.74	89	1.91	1.19	10.49	5.00	5.33	*g* 5.0	1.033	.123	*j* 29.026
Nov.	50	2.8	*a*11.57	*a*15.67	36.29	2.16	87	2.44	1.53	10.15	*e*3.17	*f*3.14	*g* 5.0	.904	.134	29.081
Jan..	49	2.5	*a* 8.74	*a*12.02	29.11	1.12	89	1.82	1.14	10.54	3.74	4.48	5.7	*h* .709	.146	29.099
May.	46	2.9	*a*13.08	21.45	*b*54.57	3.44	*c* 61	3.68	2.30	9.38	3.97	4.10	5.6	*h* .749	*i* .096	*j* 29.013
Average..	44	3.1	13.56	19.78	48.29	2.67	78	3.69	2.31	9.37	3.50	3.42	§§5.1	.802	.114	29.053
Less than the Av. Per Cent. Oct...	41	3.1	*a*15.77	*a*21.87	48.33	1.99	76	*d*3.38	2.11	9.57	2.71	1.97	*g* 6.2	.684	*i* .132	*j* 29.080
Sept.	38	4.0	*a*17.43	*a*24.40	63.15	3.43	78	5.18	3.24	8.44	2.23	1.60	4.8	*h* .903	.103	*j* 29.157
June	37	3.2	*a*15.80	*a*25.03	64.08	3.15	73	5.05	3.16	8.52	3.17	3.00	4.3	.677	.100	29.030
July.	27	4.2	*a*14.29	*a*22.81	73.04	2.96	68	6.83	4.27	7.41	2.10	1.74	3.1	.611	.068	*j* 29.085
Aug.	24	5.2	*a*17.71	*a*27.74	70.15	1.85	74	6.06	3.79	7.89	2.32	1.52	3.1	.434	.065	29.010

*, †, ‡, §, ‖, ¶, **, ††, §§. See foot-notes, with these marks, in Exhibit 33, pages 480–1.

a Exceptions to the proposition that more than the average per cent of reports stated presence of influenza in months when the Average Daily Range of Temperature was greater than the average for the year; and less, in months when it was less than the average.

The same months are exceptions in the exhibits on bronchitis and on influenza; and the statements and explanations in the text, on page 481, relative to conditions in September, October, and November, as influencing bronchitis will apply with equal truth to influenza, as tabulated in Exhibit 37, on the page opposite this.

The per cent of weekly reports stating presence of influenza was less in 1878 than in 1877 in January, February, and March, and greater from April to December inclusive. That is, in nine of the twelve months there was more influenza in 1878 than in 1877. Some of the coïncident conditions seem to have been:—

By Exhibit 12, page 341, the average temperature was considerably higher than the average for the corresponding months of the preceding 14 years in January, February, March, and April, months in which influenza is usually prevalent; and much higher in January and March, 1878, than in those months in 1877, though somewhat lower in February, 1878, than in February, 1877, which was the warmest February in the 15 years 1864–78. The monthly average of ozone observations was greater for every month in 1878 than for the corresponding month in 1877.

The supposed causation of influenza by ozone finds confirmation in the observation of one of the meteorological observers of the Board, Mr. Lee S. Cobb, of Nirvana, who stated in communications dated March 2 and 14, 1878:—

"I believe I could see a close connection between the changes in ozone (when violent) and lung and throat complaints in this vicinity. At the times when there was a large amount of atmospheric ozone present coughs and colds (?) seemed to be more prevalent. I must say, however, that I have not *always* found an increase of such complaints following such changes."

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b Exceptions to the proposition that **more** than the average per cent of reports stated presence of influenza in months when the Average Daily Temperature was **lower** than the average for the year; and **less**, in months when it was **higher** than the average.

c Exceptions to the proposition that **more** than the average per cent of reports stated presence of influenza in months when the Relative Humidity of the atmosphere was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

d There is but one exception to the proposition that **more** than the average per cent of reports stated presence of influenza in months when the Absolute Humidity of the atmosphere was **less** than the average for the year; and **less**, in months when it was **greater** than the average. It follows that, with this one exception, the quantity of vapor inhaled daily was **less**, and that the amount exhaled daily in excess of that inhaled was **greater**, in months when **more** than the average per cent of reports stated presence of influenza; and that **more** vapor was inhaled, and a **less** excess exhaled daily, in months when **less** influenza was reported.

e An exception to the proposition that **more** than the average per cent of reports stated presence of influenza in months when the amount of Ozone in the atmosphere, as indicated by the Day observations, was **greater** than the average of day observations for the year; and **less**, in months when it was **less** than the average.

f An exception to the proposition that **more** than the average per cent of reports stated presence of influenza in months when the amount of Ozone in the atmosphere, as indicated by the Night observations, was **greater** than the average of night observations for the year; and **less**, in months when it was **less** than the average.

g Exceptions to the proposition that **more** than the average per cent of reports stated presence of influenza in months when the average velocity of the wind was **greater** than the average for the 11 months, January to November; and **less**, when the velocity of the wind was **less** than the average.

h Exceptions to the proposition that **more** than the average per cent of reports stated presence of influenza in months when the Monthly Range of the Barometer was **greater** than the average monthly range for the year; and **less**, in months when it was **less** than the average.

i Exceptions to the proposition that **more** than the average per cent of reports stated presence of influenza in months when the Average Daily Range of the Barometer was **greater** than the average range for the year; and **less**, in months when it was **less** than the average.

j Exceptions to the proposition that **more** than the average per cent of reports stated presence of influenza in months when the Average Daily Pressure of the atmosphere was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

RELATION OF RAG WEED AND OF OZONE TO INFLUENZA.

The sharp rise in the influenza line, in Diagram 2, from August to September may have had some connection with the blossoming of that common plant rag weed (Ambrosia artemisiæfolia), which in Lansing was in full bloom in the week ending Saturday, August 17, 1878. By Diagram VII., page 373, it may be seen that the average line for night ozone also has a sharp rise from August to September.

RELATIONS OF RHEUMATISM TO CLIMATE AND TO OTHER DISEASES.

According to Exhibit A, page 471, there were only two diseases which caused more sickness in Michigan in 1878 than did rheumatism. By Diagram 4, on a following page, it would seem that consumption caused more sickness than did

EXHIBIT 38.—RHEUMATISM.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Rheumatism, during the Year and during each Month of the the Year 1878, Compared with some given Meteorological Conditions existing at the same time, at the State Agricultural College, near Lansing, Michigan, and near the center of the thickly-settled part of the State.**, ††

Months in Order of Per Cent of Weekly Reports Stating Presence of Rheumatism.†	Per Cent of Weekly Reports Stating Presence of Rheumatism.†	Av. Order of Prevalence when Present.‡, ††	Temperature. Degrees Fahr. Range. Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	Temperature. Range. During Day and Following Night, by Registering Thermometers,—Obs'v'd at 7 A. M.	Temperature. Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Inches of Rain and Melted Snow.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily. Relative Humidity, or Per Cent of Saturation.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily. Absolute Humidity—Grs. of Vapor in a Cubic ft. of Air.§	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Ozone,—Relative. Scale of 10 Degrees of Coloration. Day Observation,—7 A. M. to 2 P. M.	Ozone,—Relative. Scale of 10 Degrees of Coloration. Night Observation,—9 P. M. to 7 A. M.	Av. Velocity of Wind, Miles per Hour,—By Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32°F.) Range of Barometer. Monthly, and for Year.	Pressure of Atmosphere. Range of Barometer. Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Pressure of Atmosphere. Average Pressure.
Year 1878..	68	4.2	**101°	**105°	48.29	31.99	78	3.69	2.31	9.37	3.50	3.42	§§5.1	1.276	.114	29.055
More than the Av. Per Cent. Dec...	79	4.0	*a* 7.90	*a*11.71	21.29	2.27	95	1.62	1.01	10.67	4.55	4.74	.....	1.062	.142	29.147
Mar..	77	4.0	*a*12.06	*a*15.81	40.90	3.12	83	2.80	1.75	9.93	4.68	4.94	6.7	.942	.181	*j* 29.027
Jan...	75	3.6	*a* 8.74	*a*12.02	29.11	1.12	89	1.82	1.14	10.54	3.74	4.48	5.7	*h* .709	.146	29.123
Feb..	75	3.9	14.55	*a*19.21	28.07	2.74	89	1.91	1.19	10.49	5.00	5.33	*g* 5.0	1.033	.123	*j* 29.026
Apr...	75	3.9	14.07	20.10	*b*50.55	3.76	*c* 69	3.51	2.19	9.49	4.37	4.53	6.8	.921	*i* .080	*j* 28.875
Average ..	68	4.2	13.56	19.78	48.29	2.67	78	3.69	2.31	9.37	3.50	3.42	††5.1	.802	.114	29.055
Less than the Av. Per Cent of Rheumatism. May..	67	3.6	13.08	*a*21.45	54.57	3.44	61	*d*3.68	2.30	9.38	*e*3.97	*f*4.10	*g* 5.6	.749	.096	29.013
Nov...	67	4.3	11.57	15.67	*b*36.29	2.16	*c* 87	*d*2.44	1.53	10.15	3.17	3.14	5.0	*h* .904	*i* .134	*j* 29.081
June.	65	4.1	*a*15.80	*a*25.03	64.08	3.15	73	5.05	3.16	8.52	3.17	3.00	4.3	.677	.100	29.030
Oct....	65	4.4	*a*15.77	*a*21.87	48.33	1.99	76	*d*3.38	2.11	9.57	2.71	1.97	*g* 6.2	.684	*i* .132	*j* 29.080
July..	57	4.6	*a*14.29	*a*22.81	73.04	2.96	68	6.83	4.27	7.41	2.10	1.74	3.1	.611	.068	*j* 29.085
Sept..	56	5.1	*a*17.43	*a*24.40	63.15	3.43	78	5.18	3.24	8.44	2.23	1.60	4.8	*h* .903	.103	*j* 29.157
Aug..	51	5.3	*a*17.71	*a*27.74	70.15	1.85	74	6.06	3.79	7.89	2.32	1.52	3.1	.434	.065	29.010

*, †, ‡, §, ‖, ¶ See foot-notes, with these marks, in Exhibit 33, pages 480–1.

** Not an average, but the extreme range for the year.

rheumatism, but the diagram is based entirely upon the per cent of reports which mentioned each disease as present under the observation of the reporter; while in Exhibit A allowance is made for the greater estimated number of cases of rheumatism than of consumption during the occurence of rheumatism. Considering how important the disease is in relation to the welfare of citizens of this State, it is very gratifying to find that the conditions of its prevalence are so strongly marked as they appear in Diagram 4, on a following page, and in Exhibit 38, on the page opposite this; because to learn the causes or conditions essential to the prevalence of a disease is to take a great stride towards its prevention. It will be seen that it is a cold-weather disease, though it was not quite so closely related to temperature and humidity in 1878 as were some of the diseases; but its relations to ozone were nearly as close as were those of the disease which had the closest relations, the proposition concerning coincidence of rheumatism with excess of ozone holding true in eleven cases out of twelve, and the exceptional month of May being easily explained by the second figure-column in Exhibit 38, wherein it appears that the order of prevalence of the disease where it prevailed was greater in May than the average and even equaled that in January.

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†† The observations of the velocity of the wind were made at the office of the State Board of Health, Lansing.

§§ Average for the 11 months January to November inclusive.

a Exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Average Daily Range of Temperature was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

b There are but two exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Average Daily Temperature was **lower** than the average for the year; and **less**, in months when it was **higher** than the average.

c Exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Relative Humidity of the atmosphere was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

d There are three exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Absolute Humidity of the atmosphere was **less** than the average for the year; and **less**, in months when it was **greater** than the average. It follows that, with these three exceptions, the quantity of vapor inhaled daily was **less**, and that the amount exhaled daily in excess of that inhaled was **greater**, in months when **more** than the average per cent of reports stated presence of rheumatism; and that **more** vapor was inhaled, and a **less** excess exhaled daily, in months when **less** rheumatism was reported. It will be noticed that in one of these exceptions (May) both the per cent of reports and the absolute humidity are very near the average.

e There is but one exception to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the amount of Ozone in the atmosphere, as indicated by the Day observations, was **greater** than the average of day observations for the year; and **less**, in months when it was **less** than the average.

f There is but one exception to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the amount of Ozone in the atmosphere, as indicated by the Night observations, was **greater** than the average of night observations for the year; and **less**, in months when it was **less** than the average.

g Exceptions to the propositions that **more** than the average per cent of reports stated presence of rheumatism in months when the average Velocity of the Wind was **greater** than the average for the 11 months Jan. to Nov.; and **less**, in months when the velocity of the wind was **less** than the average.

h Exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Monthly Range of the Barometer was **greater** than the average monthly range for the year; and **less**, in months when it was **less** than the average.

i Exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Average Daily Range of the Barometer was **greater** than the average range for the year; and **less**, in months when it was **less** than the average.

j Exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Average Daily Pressure of the atmosphere was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

EXHIBIT 39.—CONSUMPTION.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Pulmonary Consumption, during the Year and during each Month of the Year 1878, Compared with some given Meteorological Conditions existing at the same time, as Observed and Recorded at the State Agricultural College, near Lansing, Michigan, and near the Center of the thickly-settled part of the State.**, ††

Months in Order of Per Cent of Weekly Reports Stating Presence of Consumption.	Per Cent of Weekly Reports Stating Presence of Consumption.†	Av. Order of Prevalence where Present.†, ‡‡	Temperature. Degrees Fahr. Range. Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	Temperature. Range. During Day and Following Night, by registering Thermometers,—Obs'v'd at 7 A. M.	Temperature. Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Inches of Rain and Melted Snow.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily. Relative Humidity, or Per Cent of Saturation.	Humidity of Atmosphere. Absolute Humidity—Grs. of Vapor in a Cubic ft. of air.§	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Inhaled by one Person in 24 hours.‖	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Ozone,—Relative. Scale of 10 degrees of Coloration. Day Observation,—7 A. M. to 2 P. M.	Ozone,—Relative. Night Observation,—9 P. M. to 7 A. M.	Av. Velocity of the Wind, Miles per Hour,— By Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.) Range of Barometer. Monthly, and for Year.	Pressure of Atmosphere. Range of Barometer. Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Pressure of Atmosphere. Average Pressure.
Year 1878..	71	5.2	**101°	**105°	48.29	31.99	78	3.69	2.31	9.37	3.50	3.42	§§ 5.1	1.276	.114	29.053
More than the Av. Per Cent of Consumption. Mar..	76	5.2	a12.06	a15.81	40.90	3.12	83	2.80	1.75	9.93	4.68	4.94	6.7	.942	.181	j 29.027
April	75	4.9	14.07	20.10	b50.55	3.76	c 69	3.51	2.19	9.49	4.37	4.53	6.8	.921	i .080	j 28.875
Oct...	73	5.4	15.77	21.87	b48.33	1.99	c 76	3.38	2.11	9.57	e2.71	f1.97	6.2	h .684	.132	29.080
Nov..	73	5.5	a11.57	a15.67	36.29	2.16	87	2.44	1.53	10.15	e3.17	f3.14	g 5.0	.904	.134	29.081
Feb..	72	5.2	14.55	a19.21	28.07	2.74	89	1.91	1.19	10.49	5.00	5.33	g 5.0	1.033	.123	j 29.026
May.	72	4.3	a13.08	21.45	b54.57	3.44	c 61	3.68	2.30	9.38	3.97	4.10	5.6	h .749	i .096	j 29.013
Average...	71	5.2	13.56	19.78	48.29	2.67	78	3.69	2.31	9.37	3.50	3.42	§§ 5.1	.802	.114	29.053
Less than the Av. Per Cent of Consumption. Dec..	71	5.6	7.90	11.71	b21.29	2.27	c 95	d1.62	1.01	10.67	e4.55	f4.74	.....	h1.062	i .142	j 29.147
Sept.	70	6.0	a17.43	a24.40	63.15	3.43	78	5.18	3.24	8.44	2.23	1.60	4.8	h .903	.103	j 29.157
July.	68	5.1	a14.29	a22.81	73.04	2.96	68	6.83	4.27	7.41	2.10	1.74	3.1	.611	.068	j 29.085
June	68	4.9	a15.80	a25.03	64.08	3.15	73	5.05	3.16	8.52	3.17	3.00	4.3	.677	.100	29.030
Jan..	67	5.0	8.74	12.02	b29.11	1.12	c 89	d1.82	1.14	10.54	e3.74	f4.48	g 5.7	.709	i .146	j 29.099
Aug.	65	5.6	a17.71	a27.74	70.15	1.85	74	6.06	3.79	7.89	2.32	1.52	3.1	.434	.065	29.010

*, †, ‡, §, ‖, ¶. See foot-notes with these marks, in Exhibit 33, page 480.

** Not an average, but the extreme range for the year.

†† The observations of velocity of the wind were made at the office of the State Board of Health, Lansing.

§§ Average for the 11 months January to November.

a Exceptions to the proposition that more than the average per cent of reports stated presence of consumption in months when the Average Daily Range of Temperature was greater than the average for the year; and less, in months when it was less than the average.

b There is no exception to the proposition that more than the average per cent of reports stated presence of consumption in months when the Average Daily temperature was lower than the average for the year; and less, in months when it was higher than the average.

c Exceptions to the proposition that more than the average per cent of reports stated presence of consumption in months when the Relative Humidity of the atmosphere was greater than the average for the year; and less, in months when it was less than the average.

d Exceptions to the proposition that more than the average per cent of reports stated presence of consumption in months when the Absolute Humidity of the atmosphere was less than the average for the year; and less, in months when it was greater than the average. It follows that, with these

EXHIBIT C.—*Summary concerning Propositions contained in Exhibits 33–39, concerning Relations, by Months in 1878, between Greater or Less than usual Prevalence of Diseases named and certain given coincident Meteorological Conditions.*

DISEASES.	MONTHS IN WHICH DISEASES NAMED WERE MORE THAN USUALLY PREVALENT, IN 1878.	MONTHS IN WHICH DISEASES NAMED WERE LESS THAN USUALLY PREVALENT, IN 1878.	FOR THE 12 MONTHS OF THE YEAR 1878, NUMBER OF MONTHS IN WHICH PROPOSITIONS HOLD TRUE.					
			That Diseases named were More Prevalent than usual when the Av. Temp. and Absolute Humidity were Lower than usual, and Less Prevalent when these conditions were Higher than usual.		That Diseases named were More Prevalent than usual when the Relative Humidity, Ozone, and Velocity of Wind were Greater than usual, and Less Prevalent than usual when these conditions were Lower than usual.			
			For Average Temperature.	For Absolute Humidity.	For Relative Humidity.	FOR OZONE. Day.	FOR OZONE. Night.	For Velocity of Wind.
Bronchitis	Jan. to May, Nov., Dec.	June to Oct.	10	11	10	11	11	9
Croup, Membraneous	Jan., Mar., Apr., Nov., Dec.	Feb., and May to Oct.	10	9	10	9	9	9
Diphtheria	Jan. to Mar., Oct. to Dec.	Apr. to Sept.	11	10	11	8	8	8
Influenza	Jan. to May, Nov., Dec.	June to Oct.	10	11	10	11	11	9
Pneumonia	Jan. to May, Dec.	June to Nov.	9	10	9	12	12	10
Rheumatism	Jan. to Apr., Dec.	May to Nov.	10	9	10	11	11	9
Consumption	Feb. to May, Oct., Nov.	Jan., June to Sept., Dec.	7	10	7	8	8	9

The relations of sickness from consumption to climatic conditions are quite apparent in Exhibit 39, and also in Diagram 4 on page 508, though they are not as strongly marked as are those of the more acute diseases of the respiratory tract. By that Exhibit its relations to absolute humidity of the air seem to be closer than to any other condition studied, the proposition holding true in ten cases out of twelve. This is also shown in Exhibit C, above, in which is shown for several of the cold-weather diseases how close the relations of each disease were in 1878 to each of the prominent meteorological conditions.

two exceptions, the quantity of vapor inhaled daily was less, and that the amount exhaled daily in excess of that inhaled was greater, in months when more than the average per cent of reports stated presence of consumption; and that more vapor was inhaled, and a less excess exhaled, in months when less consumption was reported.

e, f Exceptions to the proposition that more than the average per cent of reports stated presence of consumption in months when the amount of Ozone in the atmosphere was greater than the average for the year; and less, in months when it was less than the average.

g Exceptions to the proposition that more than the average per cent of reports stated presence of consumption in months when the average Velocity of the Wind was greater than the average for the eleven months, January to November; and less, in months when the velocity of the wind was less than the average.

h Exceptions to the proposition that more than the average per cent of reports stated presence of consumption in months when the Monthly Range of the Barometer was greater than the average monthly range for the year; and less, in months when it was less than the average.

i Exceptions to the proposition that more than the average per cent of reports stated presence of consumption in months when the Average Daily Range of the Barometer was greater than the average range for the year; and less, in months when it was less than the average.

j Exceptions to the proposition that more than the average per cent of reports stated presence of consumption in months when the Average Daily Pressure of the Atmosphere was greater than the average for the year; and less, in months when it was less than the average.

DIARRHEA.

By Exhibit 40 it may be seen that diarrhea was, as usual, most prevalent in the warm weather, but in 1878 its relations to absolute humidity and to ozone were closer than to temperature.

EXHIBIT 40.—DIARRHEA.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Diarrhea, during the Year and during each Month of the Year 1878, Compared with some given Meteorological Conditions existing at the same time, at the State Agricultural College, near Lansing, Michigan, and near the center of the thickly-settled part of the State.**, ††

Months in Order of Per Cent of Weekly Reports Stating Presence of Diarrhea.	Per Cent of Weekly Reports Stating Presence of Diarrhea.†	Av. Order of Prevalence where Present.†,‡‡	Temperature. Degrees Fahr. Range, Av. Daily, and for Year. Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and Following Night, by Registering Thermometers.—Obs'v'd at 7 A. M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Inches of Rain and Melted Snow.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily. Relative Humidity, or Per Cent of Saturation.	Absolute Humidity—Grs. of Vapor in a Cubic ft. of Air.§	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Ozone,—Relative. Scale of 10 Degrees of Coloration. Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.	Average Velocity of Wind, Miles per Hour,—By Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.) Range of Barometer. Monthly, and for Year.	Average Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
Year 1878.	41	4.2	**101°	**105°	48.29	31.99	78	3.69	2.31	9.37	3.50	3.42	§§5.1	1.276	.114	29.053
More than the Av. Per Cent. Aug.	84	2.9	17.71	27.74	70.15	1.85	74	6.06	3.79	7.89	2.32	1.52	3.1	*h* .434	*i* .065	*j* 29.010
Sept.	80	3.5	17.43	24.40	63.15	3.43	78	5.18	3.24	8.44	2.23	1.60	4.8	.903	.103	29.157
July.	64	3.1	14.29	22.81	73.04	2.96	68	6.83	4.27	7.41	2.10	1.74	3.1	*h* .611	*i* .068	29.085
Oct...	47	4.6	15.77	21.87	48.33	1.99	76	*d*3.38	2.11	9.57	2.71	1.97	*g* 6.2	*h* .684	.132	29.080
Average.	41	4.2	13.56	19.78	48.29	2.67	78	3.69	2.31	9.37	3.50	3.42	§§5.1	.802	.114	29.053
Less than the Av. Per Cent of Diarrhea. Mar..	34	4.0	12.06	15.81	40.90	3.12	83	2.80	1.75	9.93	4.68	4.94	6.7	*h* .942	*i* .181	29.027
June.	33	4.4	*a*15.80	*a*25.03	*b*64.08	3.15	*c* 73	*d*5.05	3.16	8.52	*e*3.17	*f*3.00	*g* 4.3	.677	.100	29.030
May.	33	4.6	13.08	*a*21.45	*b*54.57	3.44	*c* 61	3.68	2.30	9.38	3.97	4.10	5.6	.749	.096	29.013
Feb..	29	4.6	*a*14.55	19.21	28.07	2.74	89	1.91	1.19	10.49	5.00	5.33	*g* 5.0	*h*1.033	*i* .123	29.026
Apr..	27	4.5	*a*14.07	*a*20.10	*b*50.55	3.76	*c* 69	3.51	2.19	9.49	4.37	4.53	6.8	*h* .921	.080	28.875
Jan..	26	5.0	8.74	12.02	29.11	1.12	89	1.82	1.14	10.54	3.74	4.48	5.7	.709	*i* .146	*j* 29.099
Nov..	23	6.2	11.57	15.67	36.29	2.16	87	2.44	1.53	10.15	*e*3.17	*f*3.14	*g* 5.0	*h* .904	*i* .134	*j* 29.081
Dec..	20	7.1	7.90	11.71	21.29	2.27	95	1.62	1.01	10.67	4.55	4.74	------	*h*1.062	*i* .142	*j* 29.147

*, †, ‡, §, ‖, ¶, **, ††, §§. See foot-notes with these marks in Exhibit 33, page 480.

a Exceptions to the proposition that more than the average per cent of reports stated presence of diarrhea in months when the Average Daily Range of Temperature was greater than the average for the year; and less, in months when it was less than the average.

b Exceptions to the proposition that more than the average per cent of reports stated presence of diarrhea in months when the Average Daily Temperature was higher than the average for the year; and less, in months when it was lower than the average.

c Exceptions to the proposition that more than the average per cent of reports stated presence of diarrhea in months when the Relative Humidity of the atmosphere was less than the average for the year; and less, in months when it was greater than the average.

d Exceptions to the proposition that more than the average per cent of reports stated presence

DIARRHEA IN DETROIT AND THROUGHOUT THE STATE IN MARCH, 1878.

The rise for March in the line representing sickness from diarrhea, in Diagram 1, page 475, is due, in part, to the unusual prevalence of the disease at that time in Detroit, a portion of which sickness may or may not have been caused by a temporary contamination of the water-supply by roily water (due to great change of level in the settling basin, or to the disturbance of settlings in the conduits), rather than by climatic conditions. The per cent of reports stating presence of diarrhea in March throughout the State was 34; in the south-eastern division of the State (including Detroit) it was 61; in Detroit it was 100. The average order of prevalence of diarrhea in Detroit, in March, 1878, as reported by three observers, was 2, the most prevalent disease being marked 1. For three of the four weeks of the month it was marked by two of the observers as first in the order of prevalence, or as the most prevalent disease.

But though diarrhea was more prevalent in Detroit than in the State as a whole, the disease was much more prevalent throughout the State in March 1878 than in March 1877,—the per cent of weekly reports which stated it present in March 1877 was 21, and in March 1878, 34; excluding Detroit, the per cent in March 1878 was 31, showing that the per cent for the State is increased by this difference of three per cent by the extra amount of diarrhea in Detroit.

Dr. McGraw, of Detroit, has suggested, as reported in the Detroit Evening News, that the epidemic of cholera morbus and diarrhea in Detroit in March, 1878 may have been due to a constant evaporation from the streets and gutters and the steaming fields, the gutters not having carried off, as usual after a sudden breaking up of severe weather, the surplus of the winter deposit.

Perhaps the explanation suggested by Dr. McGraw may apply throughout the State; but the principal climatic conditions which were unusual in March, 1878, were as follows: The temperature (see page 341) was about ten degrees higher than the average for March during the 14 years, 1864–1877, and nearly 17 degrees higher than in March 1877; the absolute humidity (see page 353) was greater than in March 1877; the ozone, according to observations at the Agricultural College, though not at all the stations (see page 367), was less than the average for March during six preceding years, and less than in March 1877; East winds (see pages 383 and 387) seem to have been rather prevalent in March 1878.

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of diarrhea in months when the Absolute Humidity of the atmosphere was greater than the average for the year; and less, in months when it was less than the average.

e Exceptions to the proposition that more than the average per cent of reports stated presence of diarrhea in months when the amount of Ozone in the atmosphere, as indicated by the Day observations, was less than the average of day observations for the year; and less, in months when it was greater than the average.

f Exceptions to the proposition that more than the average per cent of reports stated presence of diarrhea in months when the amount of Ozone in the atmosphere, as indicated by the Night observation, was less than the average of night observations for the year; and less, in months when it was greater than the average.

g Exceptions to the proposition that more than the average per cent of reports stated presence of diarrhea in months when the average Velocity of the Wind was less than the average for the 11 months January to November; and less, in months when the velocity of the wind was greater than the average.

h Exceptions to the proposition that more than the average per cent of reports stated presence of diarrhea in months when the Monthly Range of the Barometer was greater than the average monthly range for the year; and less, in months when it was less than the average.

i Exceptions to the proposition that more than the average per cent of reports stated presence of diarrhea in months when the Average Daily Range of the Barometer was greater than the average range for the year; and less, in months when it was less than the average.

j Exceptions to the proposition that more than the average per cent of reports stated presence of diarrhea in months when the Average Daily Pressure of the Atmosphere was greater than the average for the year; and less, in months when it was less than the average.

EXHIBIT 41.—CHOLERA INFANTUM, 1878.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Cholera Infantum, during the Year and during each Month of the Year 1878, Compared with some given Meteorological Conditions existing at the same time, as observed and recorded at the State Agricultural College, near Lansing, Michigan, and near the Center of the thickly-settled part of the State.**, ††

Months in Order of Per Cent of Weekly Reports Stating Presence of Cholera Infantum.†	Per Cent of Weekly Reports Stating Presence of Cholera Infantum.†	Av. Order of Prevalence where Present.†‡	Temperature.—Degrees Fahr. Av. Range. Of Observations at 7 A. M., 2 P. M., and 9 P. M. Daily.	Av. Range. During Day and following Night.§	Average. Of Daily Maxima.	Average. Of Daily Minima.	Average. Of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Extremes.§ Maximum.	Extremes.§ Minimum.	Absolute Humidity.—Grains of Vapor in a Cubic foot of Air.	Ozone.—Relative. Scale of 10 Degrees of Coloration. Day Observation,—7 A. M. to 2 P. M.	Ozone.—Relative. Night Observation,—9 P. M. to 7 A. M.	Average Velocity of Wind, Miles per Hour, by Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. Corrected for Temperature.—Reduced to 32° F. Range of Barometer. Monthly, and for Year.	Range of Barometer. Average Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
Year 1878.	11	5.7	**101°	**105°	57.62	37.60	48.29	98	-7	3.69	3.50	3.42	‖5.1	1.276	.114	29.053
More than the Av. Per Ct. Aug.	42	4.6	*a*17.71	*a*27.74	83.00	55.31	70.15	93	43	6.06	2.32	1.52	3.1	.434	.065	29.010
More than the Av. Per Ct. Sept.	37	5.7	*a*17.43	*a*24.40	74.30	49.30	63.15	92	31	5.18	2.23	1.60	4.8	*k* .903	.103	*m* 29.157
More than the Av. Per Ct. July.	27	5.1	*a*14.29	*a*22.81	84.00	61.20	73.04	98	47	6.83	2.10	1.74	3.1	.611	.068	*m* 29.085
Average..	11	5.7	13.56	19.78	57.62	37.60	48.29	73	22	3.69	3.50	3.42	‖5.1	.802	.114	29.053
Less than the Av. Per Cent of Cholera Infantum. Oct..	10	5.9	15.77	21.87	*b*58.00	36.00	*d*48.33	*e* 82	21	3.38	*h*2.71	*i*1.97	6.2	*k* .684	.132	29.080
Less than the Av. Per Cent of Cholera Infantum. June	8	7.3	15.80	25.03	*b*75.70	*c*51.00	*d*64.08	*e* 94	*f* 39	*g*5.05	*h*3.17	*i*3.00	*j*4.3	*k* .677	*l* .100	*m* 29.030
Less than the Av. Per Cent of Cholera Infantum. May.	3	7.0	*a*13.08	21.45	*b*66.97	*c*44.80	*d*54.57	*e* 77	*f* 29	3.68	3.97	4.10	5.6	*k* .749	*l* .096	*m* 29.013
Less than the Av. Per Cent of Cholera Infantum. Feb..	3	8.8	14.55	*a*19.21	38.00	17.50	28.07	55	-7	1.91	5.00	5.33	*j*5.0	1.033	.123	*m* 29.026
Less than the Av. Per Cent of Cholera Infantum. Mar.	3	6.7	*a*12.06	*a*15.81	49.30	33.20	40.90	72	18	2.80	4.68	4.94	6.7	.942	.181	*m* 29.027
Less than the Av. Per Cent of Cholera Infantum. Jan..	2	5.3	*a* 8.74	*a*12.02	30.81	18.70	29.11	48	-4	1.82	3.74	4.48	5.7	*k* .709	.146	29.099
Less than the Av. Per Cent of Cholera Infantum. Nov..	2	8.5	*a*11.57	*a*15.67	43.00	27.30	36.29	52	15	2.44	*h*3.17	*i*3.14	*j*5.0	.904	.134	29.081
Less than the Av. Per Cent of Cholera Infantum. Apr.	2	7.7	14.07	20.10	*b*62.40	*c*42.33	*d*50.55	*e* 75	*f* 29	3.51	4.37	4.53	6.8	.921	*l* .080	*m* 28.875
Less than the Av. Per Cent of Cholera Infantum. Dec..	1	8.0	*a* 7.90	*a*11.71	26.00	14.00	21.29	36	-2	1.62	4.55	4.74	.....	1.062	.142	29.147

*, †, ‡, **, ††. See foot-notes with these marks, in Exhibit 33, page 480.

§ By Registering thermometers observed daily at 7 A. M. for the preceding calendar day.

‖ Average for the 11 months, January to November.

a Exceptions to the proposition that **more** than the average per cent of reports stated presence of cholera infantum in months when the Average Daily Range of Temperature was **less** than the average for the year; and **less**, in months when it was **greater** than the average.

b Exceptions to the proposition that **more** than the average per cent of reports stated presence of cholera infantum in months when the Average Daily Maximum Temperature was **higher** than the average for the year; and **less**, in months when it was **lower** than the average.

c Exceptions to the proposition that **more** than the average per cent of reports stated presence of cholera infantum in months when the Average Daily Minimum Temperature of the atmosphere was **higher** than the average for the year; and **less**, in months when it was **lower** than the average.

d Exceptions to the proposition that **more** than the average per cent of reports stated presence of cholera infantum in months when the Average Daily Temperature was **higher** than the average for the year; and **less**, in months when it was **lower** than the average.

e Exceptions to the proposition that **more** than the average per cent of reports stated presence of cholera infantum in months when the Daily Maximum Temperature was **higher** than the average for the year; and **less**, in months when it was **lower** than the average.

By the table on page 220 of this Report it may be seen that five deaths were reported from cholera morbus in Detroit in March, 1878, and that two deaths were reported from diarrhea in April, 1878; but notwithstanding the very noticeable sickness in Detroit from cholera morbus and diarrhea in the spring of 1878, the deaths reported in that city from cholera morbus for the entire year 1878 numbered only one more than in 1877, though nine more than in 1876; while the deaths reported from diarrhea were less in 1878 than in 1877, and much less than in 1876.

CHOLERA INFANTUM.

There is no exception to the proposition that the five months in 1878 and in 1877 when cholera infantum was most prevalent follow in order month by month the five months when the average of the daily maximum temperature, the average of the daily minimum temperature, the average daily temperature, and the minimum temperature for the month, were the greatest. The five months in which cholera infantum was most prevalent also follow in 1878, month by month, but not in *regular* order, the five months in which the average daily range of temperature (by registering thermometers) was greatest.

In June and October, 1878, the per cent of reports stating presence of cholera infantum was less than the average for the year, whereas in the same months of 1877 it was slightly greater than the average for that year; in these months the average temperature was a little more than two degrees higher in 1877 than in 1878, while the average of the daily minimum temperature was in June more than two degrees, and in October more than six degrees higher in 1877 than in 1878—again indicating that cholera infantum is caused directly or indirectly by heat, and especially by continued heat.

In 1878 the five months in which cholera infantum was most prevalent were the five months in which ozone was least abundant, though in one month (November) when cholera infantum was but little prevalent the day ozone seems to have been no more abundant than in June when cholera infantum was more prevalent. In 1877 with one exception the five months in which cholera infantum was most prevalent were the months in which ozone was least abundant. In October, a month of considerable cholera infantum, there seems to have been more ozone than in May, a month of but little cholera

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f Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Daily Minimum Temperature was higher than the average for the year; and less, in months when it was lower than the average.

g An exception to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Absolute Humidity of the atmosphere was greater than the average for the year; and less, in months when it was less than the average.

h, i Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the amount of Ozone in the atmosphere, as indicated by the Day and by the Night observations, was less than the average for the year; and less, in months when it was greater than the average.

j Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the average Velocity of the Wind was less than the average for the 11 months Jan. to Nov.; and less, in months when it was greater than the same average.

k Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Monthly Range of the Barometer was less than the average monthly range for the year; and less, in months when it was greater than the average.

l Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Average Daily Range of the Barometer was less than the average range for the year; and less, in months when it was greater than the average.

m Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Average Daily Pressure of the Atmosphere was less than the average for the year; and less, in months when it was greater than the average.

infantum. With the exception of October the five months when cholera infantum was most prevalent in 1878 were the five months when the average velocity of the wind was the least.

EXHIBIT D.—CHOLERA INFANTUM, 1877.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Cholera Infantum, during the Year and during each Month of the Year 1877, Compared with some given Meteorological Conditions existing at the same time, at the State Agricultural College, near Lansing, Michigan, and near the Center of the thickly-settled part of the State.**

Months in Order of Per Cent of Weekly Reports Stating Presence of Cholera Infantum.†		Per Cent of Weekly Reports Stating Presence of Cholera Infantum.†	Av. Order of Prevalence where Present.†, ‡	Temperature.—Degrees Fahr. Av. Range. Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	Av. Range. During Day and following Night §	Average. Of Daily Maxima.	Average. Of Daily Minima.	Average. Of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Extremes.§ Maximum.	Extremes.§ Minimum.	Absolute Humidity,—Grains of Vapor in a Cubic foot of Air.	Ozone,—Relative. Scale of 10 Degrees of Coloration. Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32°F.) Range of Barometer. Monthly, and for Year.	Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
Year 1877.		11	4.9	** 100	** 107	57.53	35.79	47.42	93	-14	3.63	3.66	3.33	1.539	.108	29.066
More than the Av. Per Cent.	Aug.	46	4	a17.45	a27.00	81.42	54.42	68.48	93	43	5.94	3.42	1.03	.401	.058	29.046
	Sept.	31	5	a18.97	a22.93	73.67	50.77	61.28	85	38	5.03	2.93	1.53	.417	.071	l 29.121
	July.	24	4	a18.07	a29.06	85.06	56.00	71.39	91	43	5.96	2.71	1.77	.655	.085	29.062
	Oct..	12	6	13.81	16.27	58.69	42.42	50.73	87	26	3.80	3.20	3.19	.695	.105	l 29.077
	June	11	5	a17.37	a25.27	78.53	53.27	66.29	89	40	5.52	3.17	2.90	.513	.084	29.021
Average .		11	4.9	15.06	21.93	57.53	35.79	47.42	74	20	3.63	3.66	3.33	.758	.108	29.066
Less than the Av. Per Cent of Cholera Infantum.	Nov.	4	7	a11.47	a12.57	41.23	28.63	35.20	55	4	2.44	h3.60	3.73	1.124	.149	29.100
	May.	2	8	16.52	27.77	b70.65	c42.87	d58.28	e 90	f 26	g 4.16	h3.29	i2.94	j .676	k .082	l 29.056
	Apr..	2	6	16.13	25.43	b57.63	32.20	46.14	e 81	18	2.85	3.70	4.27	.789	.110	l 28.971
	Dec..	1	7	a 8.77	a12.77	42.35	29.90	36.57	58	13	2.58	h3.17	3.37	.832	.117	29.178
	Mar.	1	4	15.19	24.06	34.19	10.13	24.18	51	-14	1.73	5.29	6.06	1.119	.147	l 28.981
	Jan..	1	2	a12.26	a19.65	25.97	8.33	18.14	52	-9	1.39	4.87	5.03	.896	.175	l 29.057
	Feb..	0	0	a14.86	a20.11	41.04	20.57	32.33	56	10	2.10	4.54	4.14	.977	.120	29.124

*, †, ‡, **. See foot-notes, with these marks, in Exhibit 33, page 480.

§ By registering thermometers observed daily at 7 A. M. for the preceding calendar day.

a Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Average Daily Range of Temperature was less than the average for the year; and less, in months when it was greater than the average.

b Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Average Daily Maximum Temperature was higher than the average for the year; and less, in months when it was lower than the average. There are but two exceptions to this proposition.

c Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Average Daily Minimum Temperature was higher than the average for the year; and less, in months when it was lower than the average. This proposition has but one exception.

If it be true that cholera infantum is caused principally by heat, acting directly or indirectly, and the evidence in Exhibits 41 and D tends to confirm the theory, which itself is not new, a knowledge of the fact is of the greatest importance to those having care of young children. One indication would seem to be that during the hot weather of summer the children and especially the babies should be *kept* cool, not chilled after becoming overheated. This can be done by having them live and sleep in the coolest rooms of the house, by frequent baths, by proper clothing frequently changed (light dry flannel seems to be the best, and it is important that it be worn over the bowels), and by having them sleep in cool well-ventilated beds.

Unable to walk about the room, lying most of the time on, if not under, warm clothing, sometimes for hours at a time, infant children are often exposed to extremes of heat of which those able to move about in the air and adapt their clothing to their feelings know but little.

Of course too great care cannot be taken to secure proper food, *pure water, pure air*, and freedom from exposure to sudden changes from heat to cold; but it would seem that the condition under which other conditions tending to this disease prove most disastrous is continued high temperature.

By Exhibit E, page 505, there would seem to have been a great decrease in deaths from cholera infantum in Detroit in the years 1877 and 1878. The interments in Detroit cemeteries in 1878 in each of the months July, August, and September were less than half as many as in those months in 1876. The average temperature at Detroit was in June 1877 more than two degrees, and in June 1878 more than four degrees, lower than in June 1876; but in July and August, 1877 and 1878, the average temperature was about the same as for those months in 1876. The decrease in the June temperature for 1877 and 1878 will not probably account wholly for the greatly lessened number of interments in July and August of both those years, though it may have had a considerable influence on the mortality in July. Probably the improvement in the water-supply of the city, mentioned by Dr. Rouse on page 223, was a

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d Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Average Daily Temperature was higher than the average for the year; and less, in months when it was lower than the average.

e Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Daily Maximum Temperature was higher than the average for the year; and less, in months when it was lower than the average.

f Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Daily Minimum Temperature was higher than the average for the year; and less, in months when it was lower than the average. There is but one exception to this proposition.

g An exception to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Absolute Humidity of the atmosphere was greater than the average for the year; and less, in months when it was less than the average.

h, i Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the amount of Ozone in the atmosphere, as indicated by the Day and by the Night observations, was less than the average for the year; and less, in months when it was greater than the average.

j There is one exception to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Monthly Range of the Barometer was less than the average monthly range for the year; and less, in months when it was greater than the average.

k There is one exception to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Average Daily Range of the Barometer was less than the average for the year; and less, in months when it was greater than the average.

l Exceptions to the proposition that more than the average per cent of reports stated presence of cholera infantum in months when the Average Daily Pressure of the Atmosphere was less than the average for the year; and less, in months when it was greater than the average.

in the water-supply of the city, mentioned by Dr. Rouse on page 223, was a more important factor in the prevention of deaths from cholera infantum, if the record of burials is a fair indication of the deaths which occurred. It is much to be regretted that Detroit has not a good system of obtaining vital statistics.

EXHIBIT 42.—INTERMITTENT FEVER.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Intermittent Fever, during the Year and during each Month of the Year 1878. Compared with some given Meteorological Conditions existing at the same time, at the State Agricultural College, near Lansing, Michigan, and near the Center of the thickly-settled part of the State.* *, ††

Months in Order of Per Cent of Weekly Reports Stating Presence of Intermittent Fever.†	Per Cent of Weekly Reports Stating Presence of Intermittent Fever.†	Av. Order of Prevalence where Present.‡,‡‡	Temperature. Degrees Fahr. Av. Range. Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and Following Night, by Registering Thermometers.—Obs'v'd at 7 A. M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Inches of Rain and Melted Snow.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily. Relative Humidity, or Per Cent of Saturation.	Absolute Humidity,—Grs. of Vapor in a Cubic ft. of Air.§	Vapor Inhaled and Exhaled. Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Ozone,—Relative. Scale of 10 Degrees of Coloration. Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.	Average Velocity of Wind, Miles per Hour,—By Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.) Range of Barometer. Monthly, and for Year.	Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
Year 1878..	82	2.1	**101°	**105°	48.29	31.99	78	3.69	2.31	9.37	3.50	3.42	§§ 5.1	1.276	.114	29.053
More than the Av. Per Cent of Intermittent Fever. June	92	1.5	15.80	25.03	64.08	3.15	73	5.05	3.16	8.52	3.17	3.00	4.3	h .677	i .100	j 29.080
Sept.	92	1.7	17.43	24.40	63.15	3.43	78	5.18	3.21	8.44	2.23	1.60	4.8	.903	i .103	29.157
May.	91	1.6	a13.08	21.45	54.57	3.44	61	d3.68	2.30	9.38	e3.97	f4.10	g 5.6	h .749	i .096	j 29.012
Aug.	91	1.7	17.71	27.74	70.15	1.85	74	6.06	3.79	7.89	2.32	1.52	3.1	h .434	i .065	j 29.019
July.	90	1.5	14.29	22.81	73.04	2.96	68	6.83	4.27	7.41	2.10	1.74	3.1	h .611	i .068	29.035
Oct..	90	1.7	15.77	21.87	48.33	1.99	76	d3.38	2.11	9.57	2.71	1.97	g 6.2	h .684	.132	29.080
Apr.	83	2.3	14.07	20.10	50.55	3.76	69	d3.51	2.19	9.49	e4.37	f4.53	g 6 8	.921	i .080	j 28.875
Average..	82	2.1	13.56	a19.78	b48.29	2.67	c 78	3.69	2.31	9.37	3.50	3.42	§§5.1	.802	.114	29.053
Less than the Av. Per Cent. Nov.	80	2.2	11.57	15.67	36.29	2.16	87	2.44	1.53	10.15	e3.17	f3.14	g 5.0	h .904	i .134	j 29.061
Mar.	74	2.5	12.06	15.81	40.90	3.12	83	2.80	1.75	9.93	4.68	4.94	6.7	h .942	i .181	29.027
Jan..	69	2.6	8.74	12.02	29.11	1.12	89	1.82	1.14	10.54	3.74	4.48	5.7	.709	i .146	j 29.090
Dec..	68	2.9	7.90	11.71	21.29	2.27	95	1.62	1.01	10.67	4 55	4.74	.....	h1.062	i .142	j 29.147
Feb..	66	2.7	a14.55	19.21	28.07	2.74	89	1.91	1.19	10.49	5.00	5.33	g 5.0	h1.033	i .123	29.026

*, †, ‡, §, ‖, ¶, **, ††, §§. See foot-notes, with these marks, in Exhibit 33, pages 480–1.

a There are but two exceptions to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the Average Daily Range of Temperature (as indicated by observations at 7 a. m., 2 p. m., and 9 p. m.) was **greater** than the average for the year; and **less**, in months when it was **less** than the average. There is no exception to this proposition considered in reference to the range as indicated by the registering thermometers.

b There is no exception to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the Average Daily Temperature was **higher** than the average for the year; and **less**, in months when it was **lower** than the average.

c There is no exception to the proposition that **more** than the average per cent of reports stated

CHOLERA INFANTUM IN DETROIT IN 1876, 1877, AND 1878—CONTINUED.

EXHIBIT E.—*Interments in Detroit Cemeteries, of children reported to have died from Cholera Infantum, by Months of the Years 1876, 1877, and 1878.—From Dr. Rouse's Tables on pages 220 of this Report, 160 of the Report for 1878, and 226 of the Report for 1877.*

YEARS.	Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1876-8	476	2	.....	.....	2	1	14	210	175	59	9	2	2
1876	225	1	.....	.....	1	.....	7	100	79	33	1	1	2
1877	148	.....	.....	.....	1	.....	2	64	59	17	4	1	.....
1878	103	1	.....	.....	.....	1	5	46	37	9	4	.....	.....

INTERMITTENT FEVER.

The per cent of weekly reports stating presence of intermittent fever was greater than the average in every month in which the average temperature was higher than the average for the year, and less than the average for the year in every month in which the average temperature was lower than the average for the year. It was greater than the average in every month in which the average daily range of temperature by registering thermometers was greater than the average for the year, and less in every month in which the average range of temperature was less than the average for the year.

In nine cases out of the twelve months the proposition held true that more than the average proportion of reports included intermittent fever in months when the ozone was less than the average, or less than the average proportion of reports included intermittent fever in months when the ozone was greater than the average. The foregoing is determined by means of Exhibit 42, page 504.

presence of intermittent fever in months when the Relative Humidity of the atmosphere was **less** than the average for the year; and **less**, in months when it was **greater** than the average.

d Exceptions to the proposition that **more** than the average per cent of reports stated presence of intermitent fever in months when the Absolute Humidity of the atmosphere was **greater** than the average for the year; and **less**, in months when it was **less** than the average

e, f Exceptions to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the amount of Ozone in the atmosphere, was **less** than the average for the year; and **less**, in months when it was **greater** than the average.

g Exceptions to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the average velocity of the wind was **less** than the average for the 11 months, January to November; and **less**, when the velocity of the wind was **greater** than the average.

h Exceptions to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the Monthly Range of the Barometer was **greater** than the average monthly range for the year; and **less**, in months when it was **less** than the average.

i Exceptions to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the Average Daily Range of the Barometer was **greater** than the average range for the year; and **less**, in months when it was **less** than the average.

j Exceptions to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the Average Daily Pressure of the atmosphere was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

EXHIBIT F.—*Summary concerning Propositions, contained in Exhibits 40–42, concerning Relations, by Months in 1878, between Greater or Less than Usual Prevalence of Diseases named and certain given coincident Meteorological Conditions.*

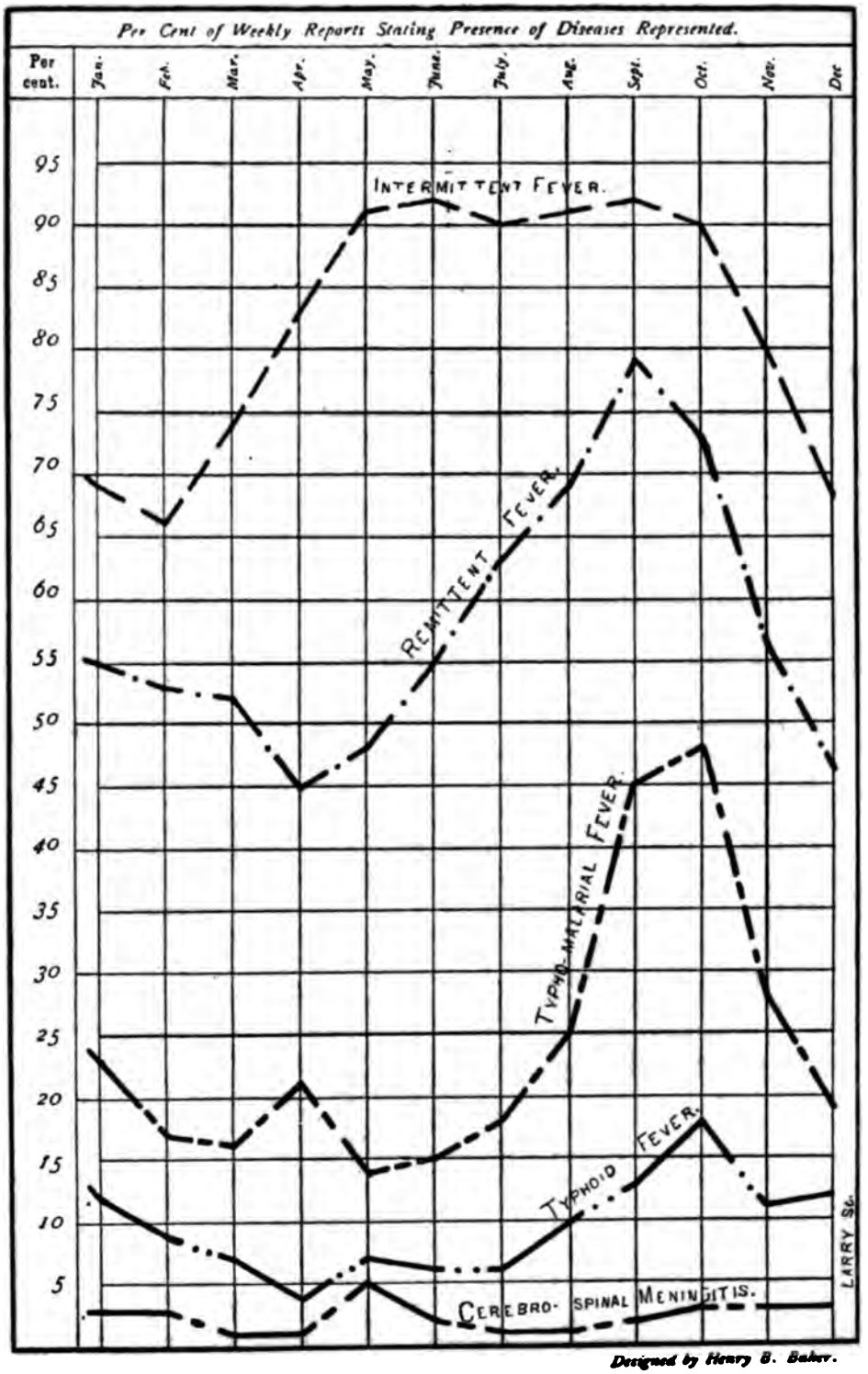
DISEASES.	MONTHS IN WHICH DISEASES NAMED WERE MORE THAN USUALLY PREVALENT, IN 1878.	MONTHS IN WHICH DISEASES NAMED WERE LESS THAN USUALLY PREVALENT, IN 1878.	FOR THE 12 MONTHS OF THE YEAR 1878, NUMBER OF MONTHS IN WHICH PROPOSITIONS HOLD TRUE.					
			That Diseases named were More Prevalent than Usual when the Av. Temp. and Absolute Humidity were Higher than Usual, and Less Prevalent when these conditions were Lower than Usual.		That Diseases named were More Prevalent than Usual when Relative Humidity, Ozone, and Velocity of Wind were Less than Usual, and Less Prevalent when these conditions were Greater than Usual.			
			For Average Temperature.	For Absolute Humidity.	For Relative Humidity.	FOR OZONE. Day.	FOR OZONE. Night.	For Velocity of Wind.
Diarrhea	July to Oct.	Jan. to June, Nov., Dec.	9	10	9	10	10	9
Cholera Infantum	July to Sept.	Jan. to June, Oct. to Dec.	8	11	8	9	9	9
Intermittent Fever	April to Oct.	Jan. to Mar., Nov., Dec.	12	9	12	9	9	7

INTERMITTENT, REMITTENT, TYPHO-MALARIAL, AND TYPHOID FEVERS.

The general correspondence in the course of the lines for these diseases for 1878 as for 1877,* exhibited for 1878 in Diagram 3, page 507, is worthy of note. In 1878 intermittent fever seems to be the first of these fevers to rise (from the direct or indirect effects of the heat?) and to continue the longest; its maximum continues from May to October, it being reported present on 90 or more than 90 per cent of the reports in every month from May to October 1878, inclusive. In 1878, remittent fever begins to rise in May, two months later than intermittent fever, and rises steadily till September, after which it rapidly declines. In 1878, typho-malarial fever followed remittent fever, about a month later, reaching its maximum in October, then rapidly declining. Except in April, May, September, and December, the line for typhoid fever corresponds somewhat closely with that for typho-malarial fever; but its maximum is in October, instead of September and October as it is in the case of typho-malarial fever. Thus it appears that in 1878 as in 1877 there was an order of succession with these fevers, the Summer fever being intermittent, the Autumnal fevers being remittent, typho-malarial, and typhoid, occurring, or reaching their maxima in the order named above. On page 299 of last Report, in referring to this subject, as illustrated by Diagram 3, the writer said: "It is worthy of note that what is reported as typho-malarial fever occupies a place between typhoid fever and the so-called malarial fevers." This is as noticeable in the diagram for 1878, opposite this page, as it was in the one for 1877 in last Report, and is a little more plainly seen because lines for other diseases do not obscure the relative positions of the lines for the fevers. The rise in the line representing sickness from typho-malarial fever in April is more like the line for intermittent than like those for remittent and typhoid fevers both which lines have a depression in April, and not in May.

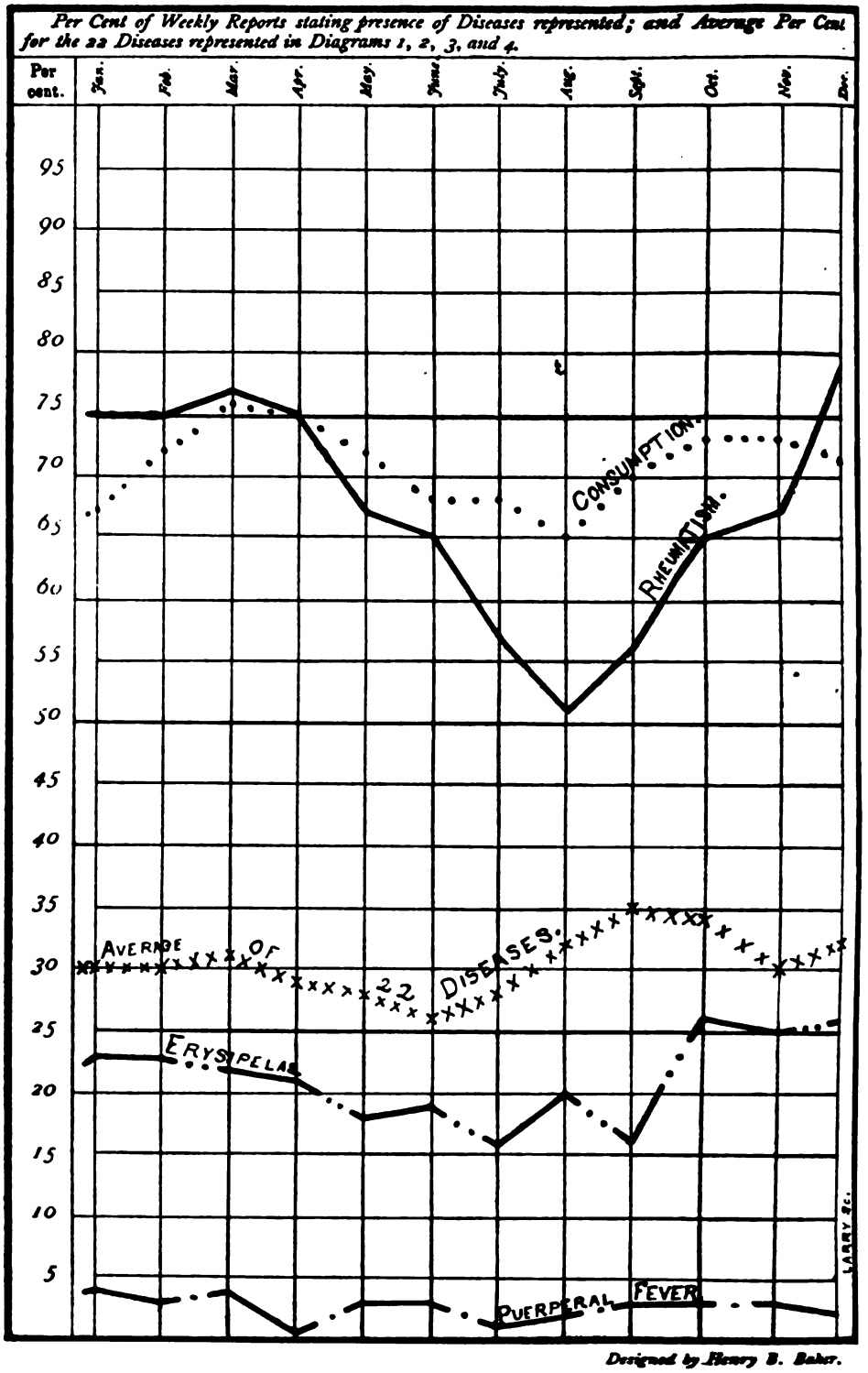
* In making comparisons of the prevalence of remittent fever, typho-malarial fev sr, and consumption in 1878 and in 1877, it should be stated, and possibly a slight allowance should be made for the fact, that the names of these three diseases were not printed on quite all the blank card-reports used in the first part of 1877.

DIAGRAM No. 2.—DISEASES IN MICHIGAN, BY MONTHS IN 1876.



Designed by Henry B. Baker.

DIAGRAM No. 4.—DISEASES IN MICHIGAN, BY MONTHS IN 1878.



Designed by Henry B. Baker.

REGULATIONS

FOR

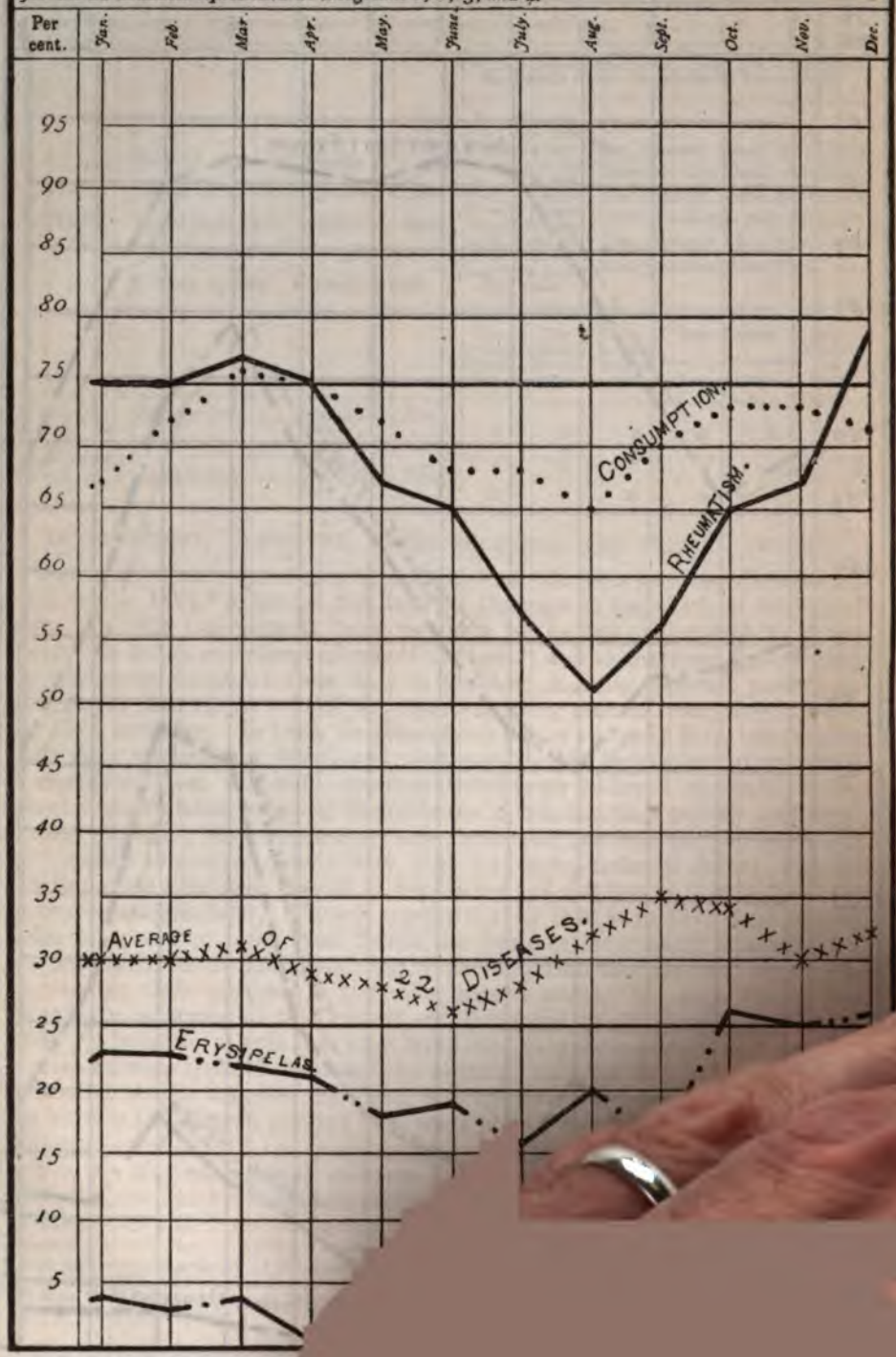
EXAMINATIONS IN SANITARY SCIENCE

BY THE

MICHIGAN STATE BOARD OF HEALTH.

DIAGRAM No. 4. —DISEASES IN MICHIGAN. BY MONTHS IN 1878.

Per Cent of Weekly Reports stating presence of Diseases represented; and Average Per Cent for the 22 Diseases represented in Diagrams 1, 2, 3, and 4.



REGULATIONS

FOR

EXAMINATIONS IN SANITARY *SCIENCE*

BY THE

MICHIGAN STATE BOARD *OF HEALTH.*

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REGULATIONS

FOR EXAMINATIONS IN SANITARY SCIENCE BY THE MICHIGAN STATE BOARD OF HEALTH.

1. An examination in Sanitary Science will be held annually at Lansing, beginning upon the Wednesday succeeding the second Tuesday in July.

2. All applicants for examination will be required to exhibit their diplomas from some reputable medical college, or give satisfactory evidence of the possession of a good practical knowledge of the English language, and of the sciences of Chemistry, Anatomy, Physiology, Pathology, and Toxicology.

3. All applicants for examination shall present their names to be enrolled by the Secretary of the Board, previously to the session of the Board of Examiners.

4. Each and every candidate for examination shall pay to the Secretary of the Board an examination fee of ten dollars before appearing at the examination, except for second examination as specified in the next paragraph.

5. The examination fee of those applicants who do not receive the certificate of the Board will not be returned to them, but a second examination will be given to such applicants, without fee.

6. Examinations will be oral, practical, and written.

7. The standard of requirements will be such, that, so far as relates to sanitary science, a person sustaining the examination, will be considered properly qualified to act as health officer of any township, city, or village in Michigan.

8. The State Board of Health will give a Certificate to such persons as, on examination, are found, by a majority vote of the members of the Board, to be qualified in Sanitary Science, according to the standard established by the Board.

9. Candidates will be examined in the following subjects:

I. BIOLOGY.—Including the reciprocal relations of the vegetable and animal kingdoms in process of growth, maturity, and decay,—the direct and indirect influences on human health.

II. THE NATURE, CAUSATION, AND PREVENTION OF DISEASES.—Including:
- a. *Vital Statistics,*—methods of ascertaining the death-rates and sickness rates from all causes, and from the different diseases, at different seasons of the year, among persons of each sex at the different ages in life;
- b. *Meteorological Conditions Coincident with certain modes of Death or sickness;*
- c. *Unsanitary conditions of surroundings,* their relations to the causation and prevention of diseases and deaths;
- d. *Occupations, Habits, and Physical and Mental Hygiene;*
- e. *Life-Histories of the Germs of Disease,* such, for instance, as small-pox; also of common bacteria; facts concerning the destruction of contagia and of bacteria by heat, etc.;
- f. *Incubation-Periods of communicable Diseases;*
- g. *Management of Outbreaks of the different Diseases.*

III. THE PHYSICAL SCIENCES.—In their relations to the principles of Construction of buildings, Ventilation, Warming, Drainage, Sewerage, Water-Supply, and to general questions in Sanitary Science, including:
- a. *Chemistry and Microscopy,* as regards the examination of Air, Water, and Food;
- b. *Meteorology,* as regards general knowledge of climatic conditions, the reading of instruments, and the correction of observations;
- c. *Topography and Geology,* as regards elevation above the ocean, and above surrounding country, the nature of the surface and of the underlying strata, the relations of such facts to the purity of the air and of the water-supply.

IV. SANITARY ENGINEERING, APPARATUS, AND APPLIANCES.—As regards Water-Supply, Sewerage, Disposal of Sewage, Excreta, and Garbage, House-Drainage, Drainage of lands and of building-sites, Ventilation, Heating, Cooking, Railroad and other modes of Travel, and Special Sources of Danger to Life and Health.

V. SANITARY INSPECTION.—Including:
- a. The *Principles of Plumbing, House-Drainage, and other Sanitary Arrangements about Dwellings;*
- b. *Seating, Lighting, Warming, Ventilating, and other Sanitary Arrangements of Schools, and other Public Places;*
- c. *Investigation of the Origin and Spread of Outbreaks or Epidemics of Diseases;*
- d. *General Inspection of Cities, Villages, and localities, with respect to drainage, sewerage, ordinary and other nuisances.*

VI. SANITARY LAW.—National, State, and Local Health Laws and Ordinances, relating to the Isolation, Restriction, and Prevention of Cases of Communicable Diseases, Disinfection, Vaccination, Notices required from Physicians and Householders, Reports to Local Boards and to the State Board of Health, Laws respecting Vital Statistics, the Inspection and care of articles Dangerous to Life and Health, Inspection of Animals, and of Foods and Drinks, the Pollution of Streams, ordinary Nuisances, Dangerous Trades, Slaughter-Houses, and Overflowed Lands.

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ERRATA.

Page vi, fourth line from bottom, insert *1*, before *Bronchitis*.
Page xxvii, the page number should be xxvii instead of xxvi.
Page 66, at bottom, add † *As amended by Act No. 56, Laws of 1877.*
Page 67, third line from bottom, read *on page 73.*
Page 114, sixth line from bottom, for *1878* read *1879.*
Pages 156 and 157, the first line of page 157 should stand immediately after the line beginning *Saginaw* on page 156.
Page 157, insert SOUTH- before EASTERN.*, first column, middle of page.
Page 174, second line, for *1877*, read *1878.*
Page 184, before REPLIES BY G. W. TOPPING, M. D., insert a line, CENTRAL DIVISION OF THE STATE.
Page 272, eighth line of second paragraph, for *provision* read *provisions.*
Page 283, fifth line, for *Saginay* read *Saginaw.*
Page 305, second line of third paragraph, for *pharnyx* read *pharynx.*
Page 349, third line, for *Registeriny* read *Registering.*
Page 409, typhoid fever line, second figure-column, for *6* read *60.*

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